CHICAGO NATURAL HISTORY MUSEUM

Bulletin

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Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

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Members are requested to inform the Museum promptly of changes of address.

WILLIAM J. GERHARD

1873–1958

On December 13, William J. Gerhard, Curator Emeritus of Insects, passed away—quickly and in the midst of an active life, as he would have wished—just three weeks before his 86th birthday. His sudden death from a heart attack deprived the Museum of its oldest and one of its most dedicated, honored and beloved staff members.

Mr. Gerhard assumed charge of the then newly created Division of Entomology on September 16, 1901. He saw it grow from a division consisting of an "old rolltop desk, two pencils, two pads of paper, a small wooden cabinet" and about 24,000 insects, to a well-equipped modern division—with collections totaling more than a million and a quarter specimens.

Although he retired as Curator in 1950, following a coronary thrombosis, Mr. Gerhard remained active as Curator Emeritus. In spite of physical limitations, he was rarely absent from work.

ASPIRATIONS FULFILLED

His last eight years were probably among the most personally satisfying in his entire career, for, relieved of administrative duties, he devoted almost full time to arranging the fruits of his life work, especially the Strecker Collection of butterflies and moths, and his personal collection of Hemiptera (true bugs) which he gave to the Museum. Few men have the opportunity, as he did, of seeing most of their life work so preserved and organized that they can view it integrated with the future. He left few "loose ends." He was meticulous and thorough.

Mr. Gerhard was well-known as an authority on the classification of the true bugs or Hemiptera, though he never wrote a single original paper on them. As a matter of fact, he published few papers, but he assisted many of his colleagues in their studies. He was truly a "handmaiden of science." The author of the only comprehensive manual on the Hemiptera of Eastern North America stated in his introduction: "The work in its present form would not have been possible had it not been for W. J. Gerhard, of the Field Museum. . . ."

He at all times submerged his personal interests for the good of the Museum, and no task was too menial, trivial or onerous for him.

He was uncomplicated, highly predictable. He had sharply defined concepts of right and wrong, respect for authority, courage to defend his stand, stubborn self-reliance to the end, a strong belief in hard work. He was scrupulous to a fault, modest, and self-effacing.

HIS LIFE'S WORK

Characteristically engrossed in his studies of the insect world, the late William J. Gerhard is seen here in his laboratory. He worked in the Museum as an entomologist for 57 years.

He was kind to and considerate of all the people around him. The children of many staff members well remember the candies which Mr. Gerhard surreptitiously slipped into daddy's briefcase. His sense of humor was well-known. He loved to play the role of the "devil's advocate" and defender of the traditional.

Although usually mild-mannered, Mr. Gerhard could erupt with a violence that shattered the nervous system of a neophyte. He ordinarily indulged in such emotional release only when he accidentally damaged a specimen. The explosions diminished in frequency in later years after female employees moved into offices across the hall from the division.

With tongue in cheek, he was the "conscience of us all" and self-appointed critic. One curator well remembers the day he turned in a monthly work report that itemized to the day his activities of the previous month. Mr. Gerhard, report in hand, came to him and slyly asked, "But, Mr. — , weren't you on vacation for three weeks last month?"

ALWAYS HELPFUL

He devoted much time to helping amateurs and students, as well as professionals, and gave a number of beginning students an opportunity to learn about insects in his division. "The boys" who owe him an eternal debt of gratitude are many, the writer among them. The most notable of these perhaps, is Dr. William Mann, former Director of the National Zoo.

His advanced formal schooling consisted of evening courses at Temple College, as well as private instruction in Latin during the time he was a Jessup Student. He spent a year (1898–99) in Bolivia where he collected butterflies and moths for A. G. Weeks, whose collection is now at Harvard. The following year he was partner in a second-hand scientific book business. In 1901 he was recommended by Dr. Skinner for the position at Field Columbian Museum as this institution was then named.

In recognition of his role in North American entomology, Mr. Gerhard was elected a Fellow of the Entomological Society of America, of which he was a charter member, and of the American Association for the Advancement of Science. He was elected a Contributor to the Museum in 1954, for the gift to the Museum of his collection and library. He was born near Reading, Pennsylvania, January 3, 1873. He is survived by four daughters, two sisters and a brother.

—R.L.W.

THIS MONTH'S COVER

Our cover shows a mural, recently installed in Hall 29 (Plant Life), of Gunnera magnifica, a strange gigantic herb found at altitudes around 10,000 feet in the Andes of Colombia. Its local Spanish name is "hoja de pantano" or "swamp leaf." Its enormous leaves are among the largest known in the plant kingdom. The plant was discovered in 1944 by Prof. Harold St. John while he was a member of the Cinchona Mission of the Foreign Economic Administration. Formerly of the University of Hawaii, he is now professor of botany at Chatham College, Pittsburgh. The mural is the work of E. John Pfiffner, Museum Staff Artist. See page 3 for an article by Prof. St. John on this fascinating plant.

GUNNERA, THE MAGNIFICENT—GIANT HERB OF COLOMBIA

By HAROLD ST. JOHN
PROFESSOR OF BOTANY, CHATHAM COLLEGE

(Picture on the cover)

CHICAGO NATURAL HISTORY MUSEUM has just paid the tribute to *Gunnera magnifica* St. John of making it the subject of a mural in Martin A. and Carrie Ryerson Hall (Plant Life—Hall 29). This species of Gunnera is outstanding as the largest yet known in that genus which contains numerous species of massive herbs. The new species was discovered by the writer in 1944 when serving as botanical explorer for the Cinchona Mission of the Foreign Economic Administration. This was a United States governmental agency devoted to the discovery and supply of quinine-rich *Cinchona* bark to meet the needs in war time of the armed forces in malaria-infested areas. During spare time all of the botanists on this mission made plant collections which in total have added much to the known flora of western South America.

The Andes Mountains enter Colombia from the south and soon divide into three parallel ranges that dominate the topography of the country. The middle and highest one is the Cordillera Central. Manizales, the capital of the province of Caldas, lies on the western slope of this rugged and lofty mountain range. The writer and his Colombian assistant, Sr. Gustavo Arcila y Arango, drove in their station wagon from Bogotá across the Río Magdalena valley, over the pass in the Cordillera Central and north to Manizales, which was headquarters for the month of November, 1944. By car it was possible to explore the country along the few main roads only, as there are almost no secondary roads. The back country could be reached only on mules.

One trip was made up the road towards Termales in the valley of the Río Cinchiná. The manager of the nearby cattle ranch, Finca Cachirí, was Sr. Eduardo Giraldo. He hospitably housed us, provided mules, guides, and on the first trip accompanied us himself. Common in the clearings and at the edge of the forest was *Cinchona pubescens*. This grew to large size, 50 feet in height and 20 inches in diameter. Its bark is thicker than that of the other species of the region, but, unfortunately, always low—that is well below 3 per cent—in quinine content. Hence, it is not a good source of the valuable medicine.

FIRST ENCOUNTER

On this first trip, November 25, 1944, we followed a trail up the little valley and after a journey of three miles encountered the *Gunnera*. The genus was an old friend, but this Colombian species was bigger and better than any seen before. The fleshy trunks were 3 to 10 feet long and 16 inches in diameter. The terminal bud scales were lance-linear and deeply laciniate, pale greenish cream-colored, and so numerous as to make the stem apex a tangled, shaggy mass. The numerous leaves were borne on spiny petioles up to 8 feet 10 inches in length. The blades were 6 feet 5 inches in diameter, rounded and shallowly lobed, and at base deeply heart-shaped. The inflorescences were erect, and when in flower 20 to 47 inches long, compound spicate. The flowers were tiny, only $^1/_{16}$ to $^5/_{64}$ inch long, but innumerable and crowded on the spikes and of a beautiful rose magenta color. The fruiting clusters were 6½ to 7½ feet long, and 8 to 21½ inches in diameter, and bore numberless tiny, red drupes.

At the very first glimpse it was obvious that the plant was noteworthy, so it was photographed in black-and-white and in color, notes were taken, and abundant specimens collected. The type specimen is deposited in the Smithsonian Institution. There are duplicates in other herbaria, including Chicago Natural History Museum.

The species was first encountered at an altitude of 10,000 feet in a low, but dense rain-forest. Individual plants were scattered in this moist forest, but in openings where a large tree had fallen, *Gunnera* was common and stouter. Then, in more permanent openings, at the forest edge, and along stream banks, it formed extensive, solid stands. It was known to the local residents by its Spanish name, "hoja de pantano" or "swamp leaf." The people made no use of it, and their domestic animals would not eat it, doubtless due to the brittle, harsh texture of the blades and the numerous little spines on the petioles.

MYSTERY OF MIGRATION

The genus *Gunnera* has long been known. It contains more than 30 species and occurs in southwest Africa, the East Indies, the Philippines, Tasmania, New Zealand, Hawaii, and South America. Most of the species are tiny, humble, creeping herbs, with blades about one inch in diameter. All of the large, conspicuous ones are in the subgenus *Panke*. These occur in the Hawaiian Islands, Juan Fernandez, in South America for the length of the Andes, and in Costa Rica in Central America, 10° north of the equator. How they could have migrated between the Andes and these distant Pacific islands is a puzzle. Certainly they did not float on the ocean, or ride on a raft! Their fruits are not sticky or armed. Apparently birds are the most probable agents of dispersal, as the tiny drupes could be eaten, but the stones would have had to remain in the digestive system an incredible time on a very long flight. For such problems there are no solutions that can be proved, and they add interest to the mystery of the origin of these fantastic herbs.

Another unique feature of the big species of Gunnera is their symbiosis. In the massive, fleshy stems are curious blue-green spots. They occur radially inward and nearly one inch distant from each node. It has been proved that the internal symbiont making these spots is *Nostoc*, one of the blue-green algae. Species of *Nostoc* also occur freely on the surface of wet soil. Apparently this alga enters the young plants through unique glands which disappear after completing their function leaving the algal cells behind.

Several of the large species of *Gunnera* are cultivated, particularly in botanical gardens. *Gunnera manicata* is hardy as far north as Scotland. The new *Gunnera magnifica* deserves to be brought into cultivation, as it is the largest of all in stature, and its inflorescences are much the largest, and of striking beauty because of the dense mass of rose magenta flowers. Judging by its cool, mountainous habitat, this plant should also be hardy in many temperature regions.

FOR THE BIRDS, AFTER YULE

Children from Lincoln School in Evanston helped decorate the birds' Christmas tree at the Museum. The tree, with strings of popcorn, suet cake, cranberries, raisins and peanut butter, was set up as an example for families seeking a useful means of disposal of their trees after the holidays. Those who provide such cafeterias for the birds are urged to replenish them with food regularly at least until the arrival of spring's better days.

Foreign Visitors Tour Museum

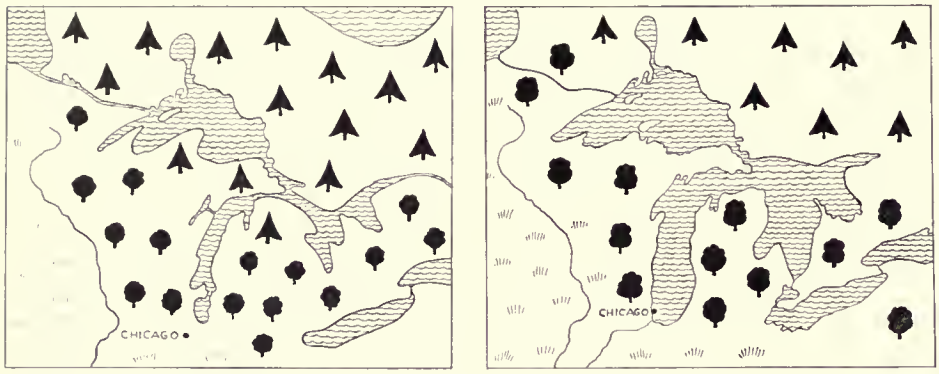
A group of foreign students and visitors representing many countries was brought to the Museum on Sunday, December 21, by the Holiday Center, operated by the Hospitality Center of Greater Chicago. The visitors were conducted on a special tour by Miss Miriam Wood, Chief of the Raymond Foundation.

The areas occupied by exhibits in the Museum comprise a space equal to more than 12 acres.

THE OLD COPPER INDIANS AND THEIR WORLD

By GEORGE I. QUIMBY
CURATOR OF NORTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

THE OLD COPPER INDIANS were the first fabricators of metal in the Americas and perhaps in the whole world. Some of them lived as early as 7,000 years ago and others survived as late as 3,000 years ago. A limited sample of their skeletal remains suggests that they were rather tall, fairly robust, and well-developed muscularly.



CHANGING ENVIRONMENT OF OLD COPPER INDIANS
At left: The region from before 5000 B.C. to about 3000 B.C. At right: Same area about 3000 B.C.-1000 B.C.

The known world of the Old Copper Indians was the Upper Great Lakes region, the lands bordering Lake Superior, Lake Michigan, and Lake Huron. This region, formerly much different from now, actually underwent radical changes in climate, flora, fauna, and land surface during the periods of Old Copper occupancy. For instance, the lake levels rose as much as 400 feet, the land in places was lifted nearly 500 feet, and the forest cover changed from pines to hard woods as the climate became hot. There may even have been a few stray whales in the Lake Huron basin.

The Old Copper Indians were miners and fabricators of copper. All of their copper was mined in the Lake Superior basin, mostly in the Upper Peninsula of Michigan. There were many mines along the Ontario shore of Lake Superior and there were thousands of prehistoric mining pits on the Keweenaw Peninsula and Isle Royal in upper Michigan.

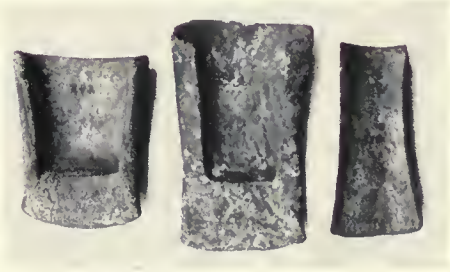
INDIANS' MINING TECHNIQUES

Remnants of wooden levers, fragmentary birchbark buckets, hammerstones, and charcoal from fires have been found in old mining pits, some of which were at least 20 feet deep. From such archaeological evidence the techniques of prehistoric copper-mining have been reconstructed:

The Indian miners followed the veins of pure copper from surface outcrops by digging pits and breaking the copper from its rock matrix with the aid of fire and water and large beach-boulders.

The rock surrounding the pure copper was heated by fire and then cracked by sudden chilling with cold water. Then it was pounded loose with boulder hammers and pried away with wooden levers. The copper thus obtained was transported to camps and villages where it was finished into tools, weapons, and ornaments.

Smelting and casting of copper were unknown. The pure copper was shaped into the intended form by cold hammering and annealing—pounding the copper and heating and chilling it to keep it from becoming too brittle. Most of the copper was fashioned into tools and weapons such as socketed axes, various types of spearpoints and knives, harpoons, pipes, awls, fishhooks, punches, and wedges. Ornaments of copper were rare. They also made tools and weapons of chipped stone and bone.



Socketed Axes and Gouge of Copper

The Old Copper Indians made their living by hunting and fishing. They hunted with the spear and possibly the bow and arrow. Among the animals they hunted were deer, elk, barren-ground caribou, lynx, and probably bison. Ducks, swans, cranes, and owls were among the birds taken. Fish were caught with nets, spears, harpoons, hooks, and gorges.

The Old Copper Indians seem to have been the first in the Upper Great Lakes region to keep dogs. There were two kinds: a small dog about the size of a coyote and a large one about the size of the largest known Eskimo dogs. Boats of some kind certainly were used by the Old Copper Indians. Their use of island areas that could not have supported any winter population demanded the use of boats. But whether these boats were wooden dugouts or bark or skin-covered canoes is not known. Although no definitely identified dwellings have been found, at one site in northern Wisconsin there were postholes suggesting an oval structure about 13 feet in diameter.

The dead were buried in cemeteries. The Old Copper gravepits contained multiple and single interments in a variety of positions. There were extended and flexed primary burials, secondary burials of bones in bundles, and cremations. With the dead were placed tools, weapons, and ornaments for use in the spirit world.

EXTREMELY ANCIENT CULTURE

The Old Copper culture is an ancient one in the Upper Great Lakes region. Some measure of its antiquity is provided by radiocarbon dates as early as 5556 B.C. (plus or minus 600 years) and 3646 B.C. (plus or minus 600 years). Occasional copper artifacts representative of the Old Copper culture have been found in New York state and Kentucky with Archaic cultural remains radiocarbon-dated at about 3000 B.C. or earlier.

In addition there is good geological evidence in support of an early date for the beginnings of the Old Copper culture. For instance, a number of finds of Old Copper artifacts as well as some Old Copper sites are in areas that would have been under water during the Lake Algonquin stage and the Nipissing stage of the Upper Great Lakes. There are at least three places where evidence indicates that Old Copper materials were covered by deposits and water planes of the Nipissing stage. Therefore these particular sites and finds must have been in position after the Algonquin stage and before the Nipissing stage. The Nipissing stage had a radiocarbon date as early as about 3000 B.C., and so these particular Old Copper sites and finds must belong to a period older than 3000 B.C.

Thus the geological evidence shows that some Old Copper sites and finds are pre-Nipissing in age and therefore older than 3000 B.C., thus confirming the assessment of age based upon the radiocarbon dates from an actual Old Copper site. It thus seems clear that the Old Copper culture had its beginnings in very ancient times, most likely by at least 5000 B.C., and that it lasted for many centuries, possibly until the end of the Nipissing stage of the Upper Great Lakes, about 1000 B.C.

The environment of the Upper Great Lakes, the only world known to the Old Copper Indians, was radically different then, particularly in the Chippewa-Stanley stage of the lakes lasting until about 3000 B.C. or slightly later. First of all, the lake levels were hundreds of feet lower. In the Lake Michigan basin Lake Chippewa was 350 feet below the present lake level. In the Lake

Huron basin Lake Stanley was 400 feet beneath the present lake level. And the waters in the Lake Superior basin were some hundreds of feet lower than at present.

During this period there were two additional large lakes in the region. At the northwest lay glacial Lake Aggasiz, which at this time drained eastward to the Superior basin, and on the northeast were the remnants of glacial Lake Ojibwa-Barlow, which at its maximum was a tremendous body of water caught between the ice front and the height of land. This glacial lake was drained to near extinction sometime during the Chippewa-Stanley stage, so it is likely that only the earliest Old Copper Indians had it on the northern periphery of

Socketed Spearpoints of Copper

their environment. Lake Aggasiz, on the other hand, seems to have persisted much longer, lasting at least into the time of the Nipissing stage. Artifacts representative of the Old Copper culture have been found on old beaches of glacial Lake Agassiz in Minnesota and Canada, suggesting that some Old Copper Indians actually lived on the shores of Lake Agassiz.

Lake Chippewa drained into Lake Stanley by means of a long river through what is now the Straits of Mackinac. Lake Stanley drained to the Atlantic Ocean by way of the Ottawa River through the North Bay, Ontario, outlet which at that time stood nearly at sea level.

With such drastically lowered lake levels there was, of course, an appreciable difference in the relation of water and land. The present lake shore would have been 25 miles or more inland in many places, whereas the former lake shore now lies under 350 or 400 feet of water.

In the northwestern part of the Lake Michigan basin near Green Bay there would have been limestone hills down which ran rivers with tremendous rapids or perhaps waterfalls that dropped 200 or 300 feet. A similar situation would have existed in much of the Superior basin and along the northern and eastern shores of Lake Stanley in the Huron basin.

Along much of the western shore of Lake Chippewa were sloping clay hills covered with deciduous forest. Remnants of this forest can still be found far beneath the waters of Lake Michigan just off Racine, Wisconsin. But at the time this forest flourished one could have walked directly from Racine to Michigan City, Indiana, or from Chicago to Benton Harbor, Michigan, through woods and dune areas on trails that today could only be followed by fish or submarines.

Along the east shore of Lake Chippewa there were sand hills, sloping sand plains, and rivers where now there is the deep water of Lake Michigan. The area embraced by the city of Chicago would have been 360 to 370 feet above the level of Lake Chippewa and 30 miles southwest of its nearest shore. From these examples one can see that the topography was much different from that of modern times. The climate, flora, and fauna were different, too.

CLIMATE BECOMES WARMER

About 6000 B.C., at the beginning of the Chippewa-Stanley stage, the ice front was in northern Ontario at about the latitude of Cochrane. By the middle of the period the ice had retreated northward from this position. The climate was becoming increasingly warmer during the Lake Chippewa-Stanley stage and was actually hot by the end of the stage circa 3000 B.C.

By the time of the beginnings of the Old Copper culture the spruce-fir forest had already retreated northward and pine had achieved a dominance of the forests over much of the region. With the dominance of pine had come an increase in the expansion of grasses, particularly in the western parts of the Old Copper world.

During the early stages of the Old Copper culture in the last half of the Lake Chippewa-Stanley period the pine dominance began to give way to the expansion of the hardwood forests with their oaks and chestnut, and the grasslands encroached even more upon the forests.

The Chippewa-Stanley stage was terminated by the upwarping of the land in the vicinity of the North Bay outlet by more than 400 feet, presumably caused by postglacial expansion of the earth released from the weight of the glacial ice that had retreated from the area some thousands of years earlier. With the North Bay outlet thus closed there was a tremendous rise in water levels climaxed by the Nipissing stage of the Upper Great Lakes, which lasted from shortly after 3000 B.C. to about 1000 B.C. Instead of a single outlet at North Bay there were two outlets, one at Chicago and another at Port Huron.

The amount of rise in the Superior basin is not known, but it must have been considerable. The water in the Lake Michigan basin rose 375 feet and the level in the Huron basin rose at least 425 feet to a single body of water with a plane about 25 feet above the present level in these basins.

The shoreline sites of the Old Copper Indians who lived during the second half of the Chippewa-Stanley stage were covered by hundreds of feet of water, and they are still covered in the southern parts of the Upper Great Lakes region where there has been no appreciable upwarping.

During the Nipissing stage the climate was much hotter than at present or at any other time during the past 18,000 or more years. Forests dominated by oak and hickory reached their maximum northward extension and the pine and spruce stands were pushed ever northward, too. This was the time of the greatest extent of grasslands in eastern North America.

Among the animals living in the Upper Great Lakes region in the days when Old Copper Indians lived in the area were deer, elk, barren-ground caribou, lynx, beaver, and bison. There is some evidence of whales in the Huron basin inasmuch as whale remains have been found in a Nipissing stage beach deposit. Occasional whales may well have entered the Huron basin from the Atlantic by way of the North Bay outlet during the Chippewa-Stanley low-water stage. Although whales were not economically important to the Indians, they may well have been incorporated into religious beliefs as sea monsters.

After about 1000 B.C. the Old Copper culture gradually disappeared. Some of the Old Copper Indians had moved northward, following the northerly drift of the pine forests and caribou. Old Copper finds from the bed of Lake Agassiz northwest of Lake Superior in Manitoba must be the product of this late movement northward. And this late northward movement ultimately may have influenced some Eskimo cultures.

Those Old Copper Indians who did not move northward found themselves in a new environment because of the change in climate. Their culture probably changed in response to the new environment, and perhaps some of them were assimilated by the

Crescent-shaped Knife and Tanged Spearpoint

Late Archaic Indians who had occupied some parts of the Upper Great Lakes region since 3000 B.C. or earlier.

In any event, the manufacture of typical Old Copper styles of tools and weapons ceased, and some forms of Old Copper weapons seem to have been copied in ground and polished slate. However, the technique of working copper by cold hammering and annealing was not lost because at about the time of Christ the Hopewell Indians used it in the manufacture of copper ornaments.

A SURVEY OF FISHES IN AN ILLINOIS STREAM

By LOREN P. WOODS
CURATOR OF FISHES

RUNNING DOWN the west side and around the foot of Lake Michigan lies a continental divide, the Valparaiso Moraine, left there by the retreat of the last (Wisconsin) glacier. This is a true divide, for water falling on the east face of it flows through the Great Lakes and out the St. Lawrence, while that falling on the west and south eventually reaches the Mississippi River and Gulf of Mexico. Actually this divide is scarcely noticeable when driving across it for it is of low relief and the streams flowing from its summit are usually sluggish. In fact, many of the streams have one or more of their source tributaries rising from the overflow of a marsh held between the low glacial-drift hills that make up the divide. Such a stream is Hickory Creek, rising in southwest Cook County, Illinois, flowing southwest, and emptying into the Des Plaines River at Joliet. Hickory Creek and its principal tributary, Marley Creek, resemble most of the smaller streams of northeastern Illinois in characteristics of low gradient, shallow valley, and banks alternately following along cultivated fields, pastures, woodlands, or through towns. Hickory Creek's fauna and flora are largely duplicated in the majority of other small streams making up our local drainage pattern.

Hickory Creek is approximately 21 miles long from its farthest east tributary to its mouth, and it drains an area of about 100 square miles. During most of the year the water is quite turbid so that only by sampling with seine, dredge, or dip net is it possible to learn anything about what lies beneath the surface. This turbidity, characteristic of most of our streams, results from run-off of fields, eroding banks, and livestock wading in the channel. These factors introduce a large amount of exceedingly fine silts and clays, of which the soils of the surrounding country have a high percentage, into the streams.

STREAM WATERS CLEAR

In late winter while the surface water is still held frozen on the land the only water entering the stream proper is ground water seepage from springs. At this time the water is free from silt and it is possible to see the stream bed along its entire length. The invertebrates that have survived the winter, the fishes, and their nesting areas all are visible. On February 3 one year, although the water was clear, in the shallow headwater portions of Marley Creek a great deal of anchor ice was present and no fishes were seen. Anchor ice is formed where the current is too swift for the formation of surface ice. The turbulent water is cooled by the air below the freezing point but it does not freeze because of its motion. Near the bottom or wherever the current is sufficiently retarded the supercooled water freezes and the ice attaches to stones, frequently to such an extent that the whole bottom may be covered by ice.

Supercooling on clear cold nights when the air temperature is below zero degrees Fahrenheit will often cause the formation of innumerable free crystals of slush ice (sometimes called frazil). The ice crystals may be sufficiently abundant to make the water milky. Slush ice and anchor ice scouring the bed and polishing the rocks or covering up the bed may greatly reduce the numbers of all kinds of animals in the creek. Some kinds of fishes survive living in the mouths of springs and some in riffles too swift for the attachment of anchor ice, but most kinds migrate downstream where they find deep holes.

MUSEUM FISH COLLECTORS AT WORK IN HICKORY CREEK, ILLINOIS

The thawing of the ice held on land and along the edges of the stream along with spring rains often swells the volume to flood stage. It is well known that during such periods of rising waters many kinds of fishes migrate upstream.

The white sucker and creek chub move upstream and spawn on gravel beds that may be covered with 12 to 24 inches of water only during flood periods, that is, within the intermittent portion of the stream. The young creek chubs remain in this part of the stream and sometimes perish if the water falls too rapidly. Other species that migrate upstream as far as they can are the stone roller, the little green sunfish, and golden shiner. The last two species even enter tiles draining fields and may work their way up to a break so they come out in a flooded field or perhaps in a suburban garden.

Lampreys and carp also migrate upstream to spawn, the lamprey very early in spring (April) and the carp a little later (May and June). The non-parasitic brook lampreys spawn on gravel riffles where the water is not more than two feet deep. With their sucker mouths they carry stones until they have constructed a shallow depression about 12 to 24 inches in diameter. The pair then attach themselves to a large stone at the upstream edge of the nest to spawn. The freshly laid eggs stick so firmly to the stones of the nest that any attempt at dislodging destroys them, but after a day or two the eggs are washed off and lie loose among the pebbles. Carp seek a shallow weedy area for their spawning—a marsh or even a flooded pasture. Usually one female is attended by several males and with much splashing the eggs are scattered widely. These eggs are adhesive and cling to plant surfaces. Many eggs are lost, but carp are very prolific—one female will produce 300,000 to 700,000 eggs in a season but not more than 400 to 500 are deposited at one time.

Altogether 38 species of fishes have been collected from Hickory Creek. Since this is a small stream, nearly all the thousands of individuals taken have also been small (less than 10 inches). They are principally of kinds that are most often found inhabiting creeks although some kinds also live in larger streams or lakes where they grow to larger sizes. In Hickory Creek there are 4 kinds of suckers, 14 species of minnows, 4 species of catfishes, 5 different sunfishes, 8 kinds of the dwarf perches (called darters) and the mud-minnow, the sculpin, and the black-striped top minnow. It is unusual to find such a diversified lot of fishes living in a stream of this size. The present inhabi-

tants of the creek are almost completely isolated from other streams by pollution at the stream mouth. Studies on Hickory and Marley Creeks have been carried on intermittently by many people during the past 50 years and a survey made within the last five years revealed the same kinds as those in Museum collections gathered 50 years ago. The fact that until recently the watershed and stream have remained relatively unchanged is no doubt responsible for this stability.

During the recent survey no little pickerel were collected, although these are still abundant in adjacent streams and were reported from Hickory Creek by the early collectors. Very likely this one species has disappeared from this stream and it is the only one of which there is a record of extinction. Two exotic species, carp and goldfish, have appeared in the stream either by invasion or introduction since the early survey was made around 1905.

Looking at the stream from the marshes at the head to the sludge-laden mouth, similar habitats of pools, gravelly riffles, broad meandering mud-bottom stretches, and weed patches occur again and again. Many of the species have very definite habitat preferences and no species is found distributed throughout the stream in a random or uniform manner. The rock bass can always be found in the deep holes under bridges while the catfishes and suckers live in the deep, mud-bottom holes of meanders or where a tributary joins the main stream. The sunfishes and several kinds of minnows prefer deep stretches with gravel or hard bottom and the darters and sculpin live on the riffles or parts of the stream where the current is most rapid. In one stretch there is a forested section and the stream here has more than usual gradient, cutting into dense clay. Here, in submerged holes in the banks, lives the translucent madtom catfish. The lower portion of the stream where broad weed patches grow in summer is the habitat of smallmouth bass 8 to 10 inches long.

GREEN SUNFISH AND REDFIN SHINER ON NET

The two most important conditions that determine how animals are distributed in streams are current and kind of bottom. These two conditions influence the vegetation, light, and carbon dioxide and oxygen content. On the other hand the conditions of current and kind of bottom are determined by the physiography, the length of the stream, and elevation of the source above the mouth.

The habitat preferences change as the fish grows. The very young fry of most species seek protection in shallows where the grass or rushes grow dense and the battle against the current is least. As they grow and change their feeding habits they move to other parts of the stream.

Since fishes are sufficiently motile they are able to seek out the place along the stream that suits them best. Once established, the individuals tend to remain throughout the season. Although they may be temporarily dislodged by a summer flood, the majority return to the same spot and never wander very far from it.

During the summer the stream population is fairly sedentary. The principal movements and migrations occur in late fall and early winter when most kinds of fishes cease to feed and seek the protection of deep holes where they crowd together. In the spring, even before the ice has completely melted from all parts of the stream, some kinds—for example, the suckers and sculpins—begin their migrations to suitable spawning areas. The other kinds—sunfishes, minnows, and catfishes—disperse later. Several kinds of sunfishes remain on the spawning beds all summer, holding a territory against others of the same species, guarding eggs or caring for successive broods.

As the population of the city and suburbs grows, few streams in our area remain unchanged. Siltation and domestic and industrial polution reduce the streams to conditions far from suitable for most kinds of fishes. Subdivisions and country homes along the valley usually destroy the very natural beauty that made the site desirable. The Hickory Creek fauna survived the establishment of farms and pastures, but within the past five years many sections have changed because of growth of villages in the watershed and building along the valley. Dredging and straightening have begun. I predict that a survey 50 years hence will be so unproductive that no biologist is likely to be interested in making it.

STAFF NOTES

Papers on technical subjects were presented before various sections of the meetings of the American Association for the Advancement of Science in Washington on December 28 by four members of the Museum staff: **Dr. Robert H. Denison,** Curator of Fossil Fishes; **Dr. Rainer Zangerl,** Curator of Fossil Reptiles; **Philip Hershkovitz,** Curator of Mammals, and, *in absentia*, **D. Dwight Davis,** Curator of Vertebrate Anatomy. . . . **Emmet R. Blake,** Curator of Birds, has returned to the Museum after nearly half a year in Peru where he conducted the Conover Ornithological Expedition. His account of collecting in little-known areas will appear in the next BULLETIN. . . . **Rupert L. Wenzel,** Curator of Insects, attended the annual meetings of the Entomological Society of America last month in Salt Lake City. He also spent several days in study of collections at the California Academy of Sciences, San Francisco. . . . **Loren P. Woods,** Curator of Fishes, recently lectured on "The Sea Lamprey in Lake Michigan" before the Izaak Walton League. . . . **Henry S. Dybas,** Associate Curator of Insects, recently spoke before the Conservation Council in Chicago on "The Periodical Cycada." . . . **Allen Liss,** Custodian of Collections–Anthropology, attended the recent annual meeting of the Illinois Archaeological Survey in Urbana.

Staff Changes Announced

At his own request, Dr. Fritz Haas, Curator of Lower Invertebrates, has relinquished the active control of his division, to assume a research and consultative status under the title of Curator Emeritus of Lower Invertebrates. Dr. Alan Solem, Assistant Curator of the division, has been promoted to Curator of Lower Invertebrates.

Melvin A. Traylor, Jr., has been promoted from Assistant Curator to Associate Curator of Birds.

Miss Patricia McAfee has been promoted from Assistant to Associate in Public Relations.

The changes are effective from January 1, 1959.

Children's Journeys Continue To Birds' Winter Resort

The Museum Journey for children entitled "Chicago—Winter Resort for Birds," will continue this month and on to the end of February. Boys and girls may take this Journey any day during regular visiting hours. They may obtain instructions and questionnaires at either the north or south entrance of the Museum. Those who successfully complete four different Journeys receive awards as Museum Travelers.

TWO CURATORS SURVEY FAUNA OF PANAMA

On January 7, Dr. Alan Solem, Curator of Lower Invertebrates, and Henry S. Dybas, Associate Curator of Insects, will depart by air for a two and one-half months' field trip in Panama.

Joining the major land masses of North and South America, Panama is a highway over which animals and plants are gradually spreading from one continent to the other. It is of particular interest to scientists because here one finds living in the same area animals and plants that everywhere else in the world are isolated from each other.

A short time will be spent on the famous Barro Colorado nature preserve in the middle of the Panama Canal. Established in 1923, this is perhaps the most famous tropical research station and the scene of many important studies on tropical life. More time will be spent in surveying the Chiriqui highland area of western Panama. There are several mountains over 11,000 feet in elevation and many unusual animals have been reported from this area. Solem and Dybas hope to determine at exactly what elevations many of these organisms are found and to work out the broad outlines of their ecology.

In contrast to the high mountain areas are the humid lowland jungles of the Province of Darien, lying between the Panama Canal and the Colombian border. If possible, some time will be spent collecting in the vicinity of a lumber or mining camp. This region is without any roads and is considered the major obstacle against ever completing the Pan-American highway as a continuous road.

Mr. Dybas will concentrate on the minute beetle fauna of the forest floor and Dr. Solem will be working with the land and fresh-water mollusks.

Gifts to the Museum

Following is a list of the principal gifts received during the past month:

Department of Anthropology

From: Robert Trier, McKenzie Bridge, Ore. — bronze Shiva, silver ornament and cotton textile, nephrite pendant, Java, Ceylon, New Zealand

Department of Botany

From: H. R. Bennett, Chicago — 1,134 phanerogams, Wisconsin, Illinois, Indiana; Dr. James E. Canright, Bloomington, Ind.— slides of wood sections from samples of *Drimys*, Brazil, Ecuador, Chile; Dr. Albert Herre, Santa Cruz, Calif.—herbarium specimen, *Usnea ceratina* Ach.; Dr. Barbara Palser, Chicago—24 specimens of Ericaceae, South Africa

Department of Geology

Mr. and Mrs. Oscar Rohwer, Chicago — a fossil fish and insect, Wyoming; Union Oil Co. of California, Calgary, Alta.—Devonian fish fragments

AUDUBON SCREEN-TOUR OF GREAT OUTDOORS

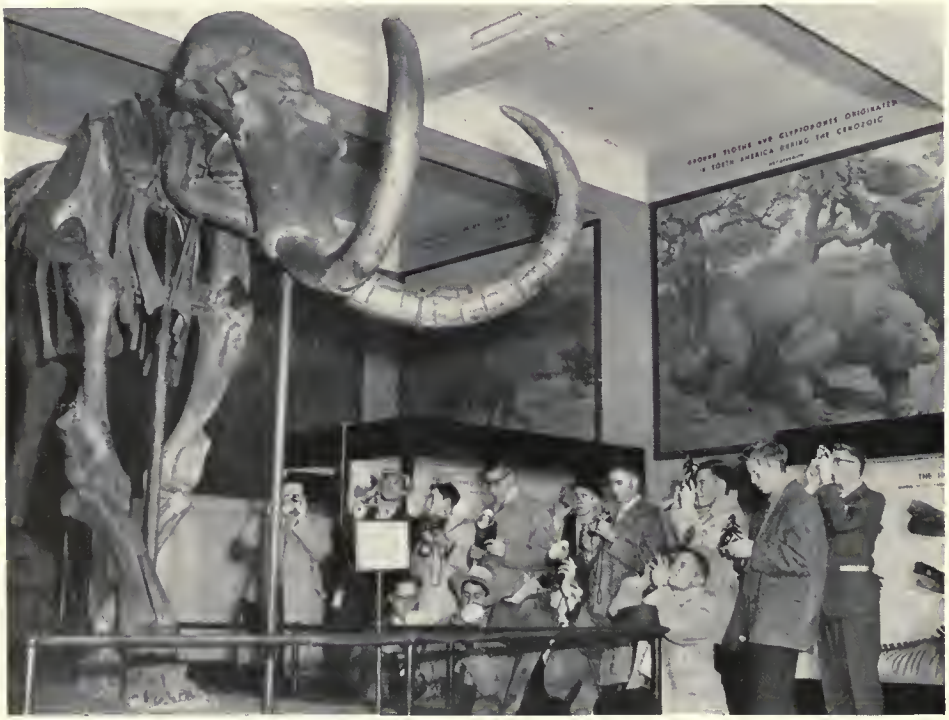
The Illinois Audubon Society will continue its series of Sunday afternoon screen-tours in the James Simpson Theatre of the Museum with the presentation on January 4 of "Outdoor Almanac," a color motion picture with narration by Charles Mohr of the National Audubon Society. The program will begin at 2:30 P.M.

Mohr's film, consisting of intimate studies of the lives of small animals, combines entertainment with a real and meaningful significance for all who are concerned with or interested in wildlife conservation. The picture begins appropriately to the season with episodes of animal life in the beautiful but harsh realities of winter, but it carries on to the fecundity of spring, the lushness of summer and the brilliance and nostalgia of autumn.

Last Call for Nature Photos

The final call for entries of prints and color slides for the Fourteenth Annual Chicago International Exhibition of Nature Photography has been issued. The deadline for receipt of entries is January 17. The Chicago Nature Camera Club and the Museum are co-sponsors. Prints selected by the judges will be displayed in Stanley Field Hall from February 7 to 27.

A BUSY DAY FOR FOUR-H-CLUB CAMERA FANS



Boys attending the recent National 4-H Club Congress found many things to photograph during their annual visit to the Museum. This year's delegation, about equally split between boys and girls, numbered approximately 1,300, representing all states of the Union, and several foreign countries as well. Their trips to Chicago were awards for achievement in agriculture, stock-raising, and other activities.

NEW MEMBERS

(November 17 to December 15)

Life Members

Charles C. Jarchow, Frank M. Whiston

Non-Resident Life Member

Dr. Rudolf A. Clemen

Associate Members

Lee Winfield Alberts, Frederick Asher, Mrs. Millington Domville, Fred L. Goldsby, Arthur Hahn, Edwin W. Hirsch, Dr. Charles E. Hughes, George R. Ives, George A. Laadt, George J. Leahy, Joseph F. Lizzardo, Mrs. Ross Llewellyn, Miss Margaret Mellody, Dr. Clement J. Michet, Harold A. Moore, Donald O'Toole, A. E. Patton, Miss Evelyn Rose, M. A. Rosenthal, Robert P. Nessler, Richard Norian, Dr. Raymond J. Pellicore, Miss Bessie Radovich, William S. Robinson, Kenneth V. Zwiener

Annual Members

Nathan Allen, Richard F. Babcock, Wallace R. Baker, Mrs. George Barnett, Eugene J. Becker, Nuel D. Belnap, Harold T. Bere, Russell O. Bennett, Donald J. Berman, Dr. Arthur Bernstein, Russell T. Berry, Dr. Chester J. Black, Dr. G. A. Bica, Dr. Henry E. Bielinski, Dr. John F. Bimmerle, George F. Brown, George M. Burditt, Isadore Cann, Miss Alice G. Capes, Dr. Marcus R. Caro, Verne T. Costa, Robert S. Engelman, Wade Fetzer, Jr., George L. Irvine, Guy C. Kiddoo, Martin H. Matheson, Miss Esther A. Miller, William S. Oliver, Mrs. Charles S. Salmon, John C. Sturgis, Dr. Eugene S. Talbot, Jack D. Train, Robert P. Weaver, R. Arthur Williams

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Members are requested to inform the Museum promptly of changes of address.

THREE NEW TRUSTEES ON MUSEUM BOARD

Three outstanding Chicagoans prominent in business, educational and civic affairs were elected to fill vacancies on the Museum's Board of Trustees at the Annual Meeting held January 19. They are: Chesser M. Campbell, President of The Tribune Company, and publisher of *The Chicago Tribune;* William V. Kahler, President of the Illinois Bell Telephone Company, and Dr. J. Roscoe Miller, President of Northwestern University.

Stanley Field was re-elected President of the Museum, and begins his 51st consecutive year in that office. All other officers were also re-elected: Hughston M. McBain, First Vice-President; Walther Buchen, Second Vice-President; Joseph N. Field, Third Vice-President; Solomon A. Smith, Treasurer; Dr. Clifford C. Gregg, Director and Secretary, and John R. Millar, Deputy Director and Assistant Secretary.

EXPEDITIONS OF 1959

The Museum's plans for expeditions and field work this year include the following:

Continuation of the Southwest Archaeological Expedition (25th season). This work, on sites in Arizona, will be, as in previous years, under the direction of Dr. Paul S. Martin, Chief Curator of Anthropology. Dr. John B. Rinaldo, Assistant Curator of Archaeology, will be principal associate in the field.

Dr. Robert F. Inger, Curator of Amphibians and Reptiles, is leaving this month for a project in the Belgian Congo (see page 7). He will also engage in research in European institutions.

One expedition began operations early in January when Dr. Alan Solem, Curator of Lower Invertebrates, and Henry S. Dybas, Associate Curator of Insects, flew to Panama to make a survey of faunal distribution.

George I. Quimby, Curator of North American Archaeology and Ethnology, will continue his investigations of the past few years in the archaeology of the Upper Great Lakes region, with trips to the shores of Lake Huron and Lake Superior scheduled for May and August.

Dr. John Thieret, Curator of Economic Botany, will continue studies of the vegetation, particularly the grasslands, in the Great Slave Lake and far northern Great Plains regions of Canada during the summer.

Dr. Robert H. Denison, Curator of Fossil Fishes, and Orville L. Gilpin, Chief Preparator of Fossils, will collect Devonian fish specimens in Wyoming and Idaho in the latter part of the summer.

William D. Turnbull, Assistant Curator of Fossil Mammals, and Ronald J. Lambert, Preparator of Fossils, will excavate fossil mammals in the Washakie Basin of Wyoming, beginning in June.

Albert W. Forslev, Associate Curator of Mineralogy and Petrology, will collect minerals at Arizona mines in September.

Dr. Fritz Haas, Curator Emeritus of Lower Invertebrates, is scheduled for work, in a field not yet chosen, during the summer.

Rupert L. Wenzel, Curator of Insects, will collect histerid beetles in Arizona in late spring.

Loren P. Woods, Curator of Fishes, will make another fish-collecting expedition aboard the Motor Vessel *Oregon* of the U.S. Fish and Wildlife Service.

Dr. Robert L. Fleming and Dr. Dioscoro S. Rabor, both Field Associates in Zoology, will continue collecting birds in their respective areas, the former in Nepal and the latter in the Philippines.

Non-Museum-staff assignments to collectors include: Harry A. Beatty to collect birds in Dutch Guiana: C. A. Ely to collect birds in Mexico; M. A. Carriker to collect birds in Colombia, and Kjell Von Sneidern to collect birds and mammals, also in Colombia.

ASSOCIATE CURATOR NAMED IN BOTANY

Dr. C. Earle Smith, Jr. has come to the Department of Botany of the Museum as Associate Curator of Vascular Plants. He began his botanical training in Florida by amassing a large local collection. In spite of an interruption for service in the U. S. Navy Hospital Corps and the Marine Corps, he completed his botanical apprenticeship at Harvard University (A.B. 1949, A.M. 1951, Ph.D., 1953). During his college years he worked as an assistant in the paleobotanical collections at Harvard's Botanical Museum, participated in an archaeological expedition to Bat Cave, New Mexico, where he helped excavate a plant series which included some of the earliest known Indian corn, and made field trips to collect plants in Colombia, Cuba and Honduras. He was also Research Assistant at the Gray Herbarium and Teaching Fellow at the Biological Laboratory. In 1953, he became Assistant Curator of Botany at the Academy of Natural Sciences of Philadelphia, where his work with the herbarium led to an interest in the history of North American botany. In 1957, he collected material of Spanish Cedar in Mexico, Panama, and Venezuela which is being used to clarify the scientific names of this group of trees.

THIS MONTH'S COVER

Our cover shows the pottery figure of a man in deep thought. It was modeled about 1,500 years ago by an Indian artist in Jalisco, Mexico. The same theme is the subject of a famous sculpture by Rodin. As we look at this figure we wonder what thoughts preoccupy the man depicted. His dejected posture and somber face convey the impression of sorrowful remembrance of things past or the sadness of bereavement. This work is representative of the expressive sculptural art of western Mexico. Another view of this figure and illustrations of other examples of pre-Columbian art from Nayarit, Jalisco, and Colima are shown on pages 4 and 5.

PROGRAMS TO AID GIRL SCOUTS

During February the Raymond Foundation of the Museum will offer special programs to assist Girl Scouts working for their nature proficiency badges.

The four programs, which will be held at the Museum each Saturday at 10:30 A.M., are devoted to specific nature subjects. On February 7 birds will be featured; February 14, wild plants and trees; February 21, rocks and minerals; February 28, insects and amphibians.

Each program consists of a movie illustrating the subject of the day, plus individual observation and study in the exhibition halls. Instructions are available at the south door. Group reservations should be made in advance by calling WAbash 2-9410.

EXPLORER FINDS RARE BIRDS IN WILDERNESS OF PERU

By EMMET R. BLAKE
CURATOR OF BIRDS

THE BOX of birdskins delivered to my office that August day in 1955 bore the return address of a collector in Cusco, Peru. Such shipments are received from various sources around the world every year and may comprise a single specimen or total as many as several thousand. Often the processing of these collections is merely a routine matter of accessioning, identifying, and cataloguing the specimens preparatory to filing them away in laboratory cabinets for convenient reference as the need arises, sometimes months or even years later.

But this shipment was exceptional. Although totaling fewer than one hundred birdskins, these were the first to be taken in Departamento Madre de Dios, a heavily forested and largely unexplored region that extends from the Andean foothills eastward to the Brazilian and Bolivian frontiers. Several of the birds represented interesting extensions of range, others were forms new to our collections, and one obscurely-colored specimen, a member of the antbird family, I have since described as a distinct new species (*Formicarius rufifrons*).

SEVEN-DAY WORK WEEK

And expedition toil often continues far into the night as well. Curator Blake here is seen preparing bird specimens in camp near mouth of Rio Inambari.

I was especially pleased to find that many of the birds, including the new species, had been collected at the mouth of the Rio Colorado, a tributary of Rio Madre de Dios and home of the nomadic Mashco Indians of unsavory reputation. Obviously, these tribesmen were not so truculent as had been supposed, and indications were that a collecting trip through the heart of Madre de Dios might now be feasible. If a small collection so rich in novelties could be made almost at random by several natives traveling on a balsa raft, what might not be accomplished in the same region by a properly equipped Museum expedition? These heady thoughts led to the intensive study of maps and all pertinent literature, and to correspondence with individuals who might have information of value, and ultimately to my trip into the Amazonian forests of southeastern Peru.

Such was the genesis of the Museum's Conover Peru Expedition* which returned to Chicago late in 1958 after the successful conclusion of its field work. For me it had been a memorable experience that began shortly after dawn on June 1 when Panagra's crack airliner, *El Pacifico*, just twelve hours out of Miami, coasted through Lima's perpetually overcast sky and abandoned me to the courteous but enterprising attentions of the Peruvian customs officers.

INEVITABLE RED TAPE

The formalities were quickly finished and I was plunged almost at once into a seemingly endless round of conferences with governmental officials and others relative to the freeing of my guns, ammunition and other equipment from customs in the port of Callao. Days lengthened into weeks, frustration followed frustration, and my folio began literally to bulge with documents, but finally I was granted the freedom of the country. Fortunately, life in the "bush" offers few experiences as arduous as those which usually confront the leader of a scientific expedition entering a tropical American country. The field work that follows, be it light or ever so strenuous, seems a haven of repose by comparison.

I planned a leisurely canoe trip down Rio Madre de Dios from its turbulent headwaters to Puerto Maldonado. My specimens would be collected along the way and hunting camps in key localities might be occupied for as long as three weeks. Thus I could blanket much of Madre de Dios and in a single dry season bring together a collection that would be representative of the entire region.

Cusco, storied capital of the old Inca Empire and now a mecca for tourists, became for a time the base of my operations. The two-hour flight from Lima crosses the Andes at an altitude of 20,000 feet, permitting breath-taking glimpses both of towering peaks capped with ice and of the great arid *alto plano* of the interior. But once in Cusco there was little time for sightseeing. While awaiting the arrival of my equipment by rail, it was necessary to pack field supplies and arrange for transportation to the eastern lowlands. Most important of all I needed to find and develop useful local "contacts." Among the latter was Dr. Ismael Ceballos, a young mammalogist and zoology professor of the University of Cusco, who agreed to assist me during the early stages of my field work near the sources of the Alto Madre de Dios.

Hacienda Villa Carmen, my first collecting station, is bounded by the Tono and Piña Piña rivers, tributaries of the stream I hoped to descend. Nearby, a dozen crude huts, one by courtesy designated a hotel, comprise the village of Pilcopata. Traveling by truck we reached the isolated community in a single day via a narrow dirt road that much of the way clings precariously to the sides of gorges. At several points battered remains of vehicles far below bore witness to the frequency of landslides. Happily the route was interesting and the scenery surpassingly beautiful. In a matter of hours we had the experience of descending from barren highlands, through luxuriant "cloud forests," to the humid lowlands. And with each marked change in vegetation there was a corresponding change in bird life that I always find fascinating.

AREA IN SOUTHEAST PERU WHERE EXPEDITION OPERATED

Don Miguel Palomino, the owner of Villa Carmen, was for three weeks my genial host. He supervised our passage over the gorge of Rio Tono on a swaying platform

(*Continued on page 6, column 1*)

*Named for the late Boardman Conover, a Benefactor and former Trustee of the Museum, whose generous bequest made the Peruvian field work possible.

1. Mother suckling child

2. Woman with wrap-around skirt

3. S

Photographs by John

8. Man with musical rasp

ANCIENT ART OF

By DONALD COLLIER, *Curator of*

TWO recently installed exhibits in Hall 8 (Ancient and Mo of pre-Columbian clay sculpture from the Mexican states logical knowledge of western Mexico is meager, there are ex from tombs in the area by pot-hunters. These sculptures, grouped roughly into the Nayarit style, found in Nayarit an Colima and Jalisco. These two styles had their beginnings Christ and continued to flourish until about A.D. 700.

Nayarit sculpture (see cover and illustrations numbered 1, and sometimes the human figures appear to be caricatures.

9. Kneeling woman

10. Woman with long hair

11. Seated woman

ıg dog

and Homer V. Holdren

4. Thinking man

5. Warrior with armor and club

VESTERN MEXICO

American Archaeology and Ethnology

Indians of Mexico and Central America) display examples Nayarit, Jalisco and Colima. Although systematic archaeo- ive private and museum collections of art objects removed ch range from a few inches to two feet in height, can be adjoining part of Jalisco, and the Colima style, found in ng the Archaic or Formative stage several centuries before

6. Hairless dog

8, 9, 11) is characterized by simplification and exaggeration, men and women are depicted, engaged in workaday, cere- ıonial, or warlike activities. Their clothing, ornaments and ody painting are shown by modeling, incising, and both posi- ive and negative (resist) painting. A good example of this de- iction of detail is the warrior shown at the right (No. 5) who ears armor of basketry and quilted cotton and carries a stone- eaded club. The larger figures are hollow and have an opening t the top of the head.

7. Seated man

Colima-style figures (illustrations 2, 3, 6, 7, 10) are natural- stic, refined and elegant. Instead of the mat, polychrome- ainted surfaces of Nayarit sculpture, they have highly bur- ished red, brown, or black surfaces without textural or painted laboration. The women have strong, tranquil faces and a easant solidity. The Colima sculptors also depicted mammals, irds, reptiles, fish and shellfish. Their favorite animal was he dog, of which they made a great variety of hollow effigies. Dogs were raised by the ancient Mexicans both for food and acrificial offerings. It is not clear whether the Colima clay ogs were placed in tombs as food offerings or to represent dogs acrificed at the funerals to assist their masters in the difficult ourney to the land of the dead.

IN PERUVIAN WILDERNESS—

(*Continued from page 3*)

suspended beneath a cable. As we dangled high above the cataracts, I was relieved to learn that even a dismantled truck had once made the same trip in safety. We were soon installed in our quarters—the entire second story of Casa Palomino. The breezeway became my laboratory through which was channeled an endless flow of birds that required my prompt attention. Shooting birds is only the first and often the easiest step in preparation of museum specimens. To become of any use to science they must also be skinned and stuffed, labeled, catalogued, dried, and finally packed for shipment. There are doubtless easier ways to pass one's time in the glamorous tropics.

READY FOR VOYAGE ON RIVER THROUGH JUNGLE

Members of the expedition aboard launch. Curator Blake is the one wearing hat. Juan Neuenschwander is seen at his left.

A typical work day—and there are seven to the week for bird collectors—begins at dawn and continues until the last specimen has been cared for. Birds are most active during the early morning hours and a successful hunt usually provides work that may continue into the nights. At Villa Carmen, and later in Madre de Dios, I went hunting as time permitted, but largely depended upon the prowess of two local Indians, who were provided with guns and ammunition. Separately, we scoured the plantation itself and roamed the wooded hills in a relentless search for birds of widest variety.

The collection grew rapidly. It soon filled to overflowing my specimen trunks, and in the space of several weeks came to include all of the common species and many of the rarer ones. Some of the birds were brilliantly colored and others drab, some large and some small. When studied in its entirety, so representative a collection from an area of transition between mountains and lowlands will almost certainly throw new light on problems of distribution.

My carefully weighed plan to descend the river by canoe had to be abandoned when Don Miguel announced that rapids of the headwaters would be impassable until the October rains. By way of humoring my disbelief he took me on a short cruise from which I returned wiser, as well as drenched, shaken and considerably chastened. The necessity of "playing it by ear" as circumstances dictate often becomes standard procedure in the field. Although disappointed, I hastened back to Cusco to work out plans for an attempt on the Madre de Dios from the lower, or Puerto Maldonado end.

The chance remark of a casual acquaintance led me to Señor Juan Neuenschwander, a man whose personal qualifications and boat equipment based at Puerto Maldonado virtually assured the success of my subsequent field work. We came to an agreement as to costs and procedures, hastily packed two months' supplies, and set out for the capital of Madre de Dios. The first half of the journey was overland by a one-way road that attains an altitude of 18,000 feet before plunging into the lowlands. A brief airplane flight from Quincemil to our destination offered a birdseye view of the unbroken tropical forest that would be our home for many weeks.

A FLOATING LAB

Neuenschwander's boat, the *Neutron*, was a 35-foot. steel-hulled launch powered by an ancient Buick engine of uncertain temperament. The small cabin for'ard served as a floating laboratory where I worked when under way. We also towed a large canoe fitted with a powerful outboard motor for use in rapids, and for collecting on smaller streams.

The *Neutron's* crew included two veteran rivermen who doubled as hunters—among the best I've ever known. The "motorista" also cooked, served meals, washed clothes and cared for the expedition mascots. In time these came to include a brace of baby peccaries, a large tortoise, several parakeets, a young white-faced night monkey and a testy red howler. The latter was a most ungrateful beast that bit hands, gorged on our last plantains, and deserted us at the first opportunity.

A preliminary shakedown cruise seemed in order before undertaking the long and difficult trip up the Madre de Dios. For this I selected a large tributary stream, Rio Tambopata, where valuable collections might be made. Our days on the river were much alike. Breakfast was finished and camp broken by the time the sun was melting away the river mist; but not before enough birds had been shot to keep me busy at the skinning-table until well into the afternoon. As I worked, the motor strained against the current hour after hour, for as much as ten hours a day. Usually the noon meal was eaten aboard while under way. Finally, just before dark, we tied up at a convenient sandbank where supper was quickly cooked. Sometimes we went out later to jacklight owls and nightjars, or to fish. But more often the fire was dead and the camp stilled by 8 P.M.

Our highest point on Rio Tambopata, and main collecting locality, was at the furthermost civilized habitation, a rubber hunter's site a little below the mouth of Rio Malinowski. Here we found several miles of forest trails that were ideal for hunting purposes. I commandeered one of the three thatch huts and set up shop on a porch overlooking a magnificent sweep of the river.

Collpa was a place of much activity from the pre-dawn hours until nightfall. Outlying rubber hunters and their families drifted in and out at intervals and the yard seemed always overflowing with puppies, chickens, and dusky, beady-eyed children. The heat was often unbearable, the insects insufferable, and the curiosity of the natives insatiable. But the area teemed with game, and with birdlife of such astonishing abundance and variety that I regretted the necessity of returning to Puerto Maldonado after a visit of only three weeks.

INTO REAL WILDERNESS

The distance by river between Puerto Maldonado and the Piro Indian village of Manu is roughly twice that as a macaw flies. The trip can be made in little more than a week by motorized canoe, but we stretched it out for a month in order to collect along the way. On leaving Puerto Maldonado, plantations soon drop behind and the region beyond is virtually uninhabited, even by Indians.

Game was everywhere plentiful. We saw no jaguars, but their tracks and those of tapir, peccary, capybara, and deer were conspicuous on almost every mudbank. As we plowed somewhat noisily upstream, flocks of large-billed terns and skimmers rose from the gleaming *playas* in fright and often the boat was paced by heavily-winged herons of several varieties. From time to time green and blue kingfishers, some little larger than sparrows, darted across our bow. Flocks of screeching parrots and raucous-voiced bright-plumed macaws streamed high overhead toward distant fruiting trees. At almost every turn in the river we flushed cormorants, anhingas, ducks, crested screamers, wood ibises, and jabirus. And now and again we

caught brief glimpses of more retiring birds—sungrebes, sunbitterns, tanagers and others.

Established camps are essential to serious bird collecting. While ascending the Madre de Dios we occupied several for as much as ten days each. The daily routine at these bases was much like that at Collpa, on Rio Tambopata, but I preferred to work and to sleep ashore under a large tarpaulin erected on the wooded embankment. There, in the absence of local natives, interruptions were at a minimum. As our time ran out, the pressure of collecting increased and it was a rare day when the growing collection was not enhanced by the addition of at least several new species. One, a partridge-like tinamou, is undoubtedly new to science, and several others may yet prove to be so.

ASCENDING RIO MADRE DE DIOS

The course of the expedition boat was flanked by unbroken walls of tropical forest.

The dry season, affording optimum collecting conditions, held through September and into October. But, as the weeks slipped by, angry black thunderheads began to form in the hills far to the westward, lightning scored the skies at night, and showers became increasingly a daily occurrence. Then came the seasonal rains, the almost continuous drizzle punctuated by cloudbursts of torrential proportions that would continue through February, raise the rivers by as much as twenty feet, and inundate most of the region.

Our sheltered camp near the mouth of Rio Colorado was almost swamped out by the first storm and we were never dry thereafter. Hunting continued, but birds became difficult to find in the dim, dripping woods and the finished specimens almost impossible to dry. We remained for a week longer, but finally accepted the inevitable and pushed on to Manu. There I remained to round out the collection after releasing the *Neutron* and its crew for a speedy return home on the crest of the flood.

Tradition has it that fifty years ago, at the height of the rubber boom, the Manu area supported a population numbered in thousands. Today there remain fewer than two dozen scattered thatch huts, the homes of phlegmatic Piro Indians. Fortunately, the single industry, a primitive sawmill, afforded me both shelter and a base of operations. The mill shed was small and littered, but space for my hammock and skinning table was found on either side of the shuttling log carriage. As I worked, the shrieking buzz-saw at my elbow presumably drowned out any opinions I may have voiced relating to the rain, the heat, the insects—and the noise.

Field work of the Conover Peru Expedition was concluded at Manu toward the end of October. By a stroke of good fortune I found passage up the Alto Madre de Dios to Hacienda Villa Carmen, head of navigation, as supercargo in a mammoth dugout canoe powered by an outboard. For us the usual three-day trip required a week—a week that I'll long remember as a period of minor vexations, physical discomfort, short rations (for in time even monkey stew becomes disenchanting as a steady diet), and occasional near catastrophe in the swollen waters. But arrive we did, to be welcomed appropriately by Señor Palomino. That same night I crossed the now raging Rio Tono, bag and baggage, by cable platform during a driving rainstorm and boarded a truck for the long climb back to Cusco.

All in all it had been a varied and interesting field trip, though largely routine as such things go. The scientific results will not be known for some time to come. First, the thousand-odd birds must be identified and catalogued, the new forms described and named, and the entire collection studied critically as steps in the preparation of the final technical report. In this manner, little by little, slowly and sometimes painfully, we learn more about the world around us, and of the myriad creatures that inhabit it.

CURATOR TO MAKE STUDY IN BELGIAN CONGO

On February 8, Dr. Robert F. Inger, Curator of Amphibians and Reptiles, and his wife, Mary Lee, will leave for the Belgian Congo. Dr. and Mrs. Inger are going at the request of the Institut des Parcs Nationaux du Congo Belge in conjunction with a study of amphibians from the Parc National de la Garamba. This park is located in the northeastern portion of the Belgian Congo. The principal objectives of the field work are a survey of amphibian habitats and the collection and rearing of tadpoles.

In collaboration with the late Dr. Karl P. Schmidt who was Curator Emeritus of Zoology, Dr. Inger prepared a report on amphibians from another national park in the Belgian Congo, the Parc National de l'Upemba. It was as an outgrowth of the Upemba study that the Institut des Parcs Nationaux asked Dr. Inger to work on the amphibians of the Garamba.

ANIMALS AT NIGHT IN AUDUBON FILM

The first film of its kind—"Animals at Night in Color"—will be shown by the Illinois Audubon Society in the fourth of its current series of screen-tours on Sunday afternoons in the James Simpson Theatre of the Museum. This unique film will be accompanied by a lecture by Howard Cleaves. The movie, made by means of special techniques which Cleaves developed for the purpose, will be presented on February 22 at 2:30 P.M. Cleaves stalked and captured in color pictures the wildlife of Horicon Marsh in Wisconsin, the Okefenokee Swamp of Georgia, and other localities rich in animal inhabitants. Under the spell of strong beams of light employed by Cleaves, many timid birds and other animals became transfixed. Among those which apear in the film are grebes, plover, green-winged teal, chimney swifts, gray foxes, skunks, deer, alligators, raccoons, ospreys, coots and great blue herons.

Members of the Museum and their guests are cordially invited to attend the lecture.

Attendance Exceeds a Million for 32nd Year in a Row

The number of visitors received at the Museum during 1958 was 1,049,401, marking the 32nd successive year in which attendance has exceeded a million. As always, the great majority of visitors were admitted free of charge. There were 887,808 or more than 84 per cent in this group, which includes those coming on the free days (Thursdays, Saturdays and Sundays), and children, teachers and students who are admitted free on all days.

NATURE PHOTO SHOW FEBRUARY 7—27

RESULTS of the art of nature captured by the art of photography may be seen at the 14th Chicago International Exhibition of Nature Photography which is to be held at the Museum, February 7 through February 27.

Several hundred color and black-and-white prints of scenic and unusual natural phenomena, plant life and animal life, photographed by amateur and professional photographers, will be on display in Stanley Field Hall. In addition to the prints selected for exhibition accepted color-slides will be shown on the screen of the Museum's James Simpson Theatre on two Sundays, February 8 and February 15 at 2:30 P.M. Admission to both showings is free.

LION FISH
An entry in the Nature Photo Show, submitted by Richard P. Klein, of Cleveland, Ohio.

The annual exhibition, sponsored jointly by the Museum and the Nature Camera Club of Chicago, is probably the world's largest competition devoted solely to nature photography and one of the major photographic exhibits of any kind. Several hundred prints and slides will be shown, of which many will depict nature in far distant areas of the globe.

Medals have been awarded to first place winners, and ribbons to those receiving honorable mention. The Photographic Society of America gave special prizes for slides best representing harmony in color.

The photographs for the show were selected by a group of judges composed of: Anne Pilger Dewey, photographer; Dr. Roland W. Force, Curator of Oceanic Archaeology and Ethnology, and William D. Turnbull, Assistant Curator of Fossil Mammals at the Museum; N. J. Schmidt, photographer, and Edward T. Triner, biology teacher and naturalist.

The list of contest winners will appear in the March BULLETIN.

STAFF NOTES

Dr. Rainer Zangerl, Curator of Fossil Reptiles, attended a recent symposium on morphology organized by the American Society of Zoologists and held at Washington, D.C. . . . **Dr. Robert H. Denison,** Curator of Fossil Fishes, recently made two study trips to scientific institutions in Cambridge, Massachusetts, and Washington, D.C. While in the latter city he also attended the combined meetings of the American Society of Zoologists and the American Society for the Advancement of Science. He presented a paper on bone patterns in early vertebrates. . . . **Emmet R. Blake,** Curator of Birds, has been appointed to the Committee on Nomenclature and Classification of the American Ornithological Union. . . . **André Nitecki,** Cataloguer in the Library, will conduct a course in cultural anthropology under the title "Ways of Mankind" for the American Foundation for Adult Education. . . . **Frank Jensik** has been appointed Captain of the Guard. Prior to this promotion he was Senior Sergeant.

Last Month of Bird Journey; Ancient Seas Next

February is the last month of the Museum Journey for Children entitled "Chicago—Winter Resort for Birds." Beginning March 1, the spring journey, "Life of Ancient Seas" will be offered, continuing through May 31. Boys and girls taking these Journeys obtain instructions and questionnaires at the Museum entrances. Those who complete a series of journeys on four different subjects receive awards as Museum Travelers. After eight Journeys they become Museum Adventurers, and after twelve, Museum Explorers.

NEW MEMBERS

(December 16 to January 16)

Contributor

DeWitt Van Evera

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Avery Brundage, Mrs. Walter A. Krafft, Sanger P. Robinson, Mrs. Louis Ware

Associate Members

John G. American, Carlyle E. Anderson, Horace Barden, Mrs. Henry G. Barkhausen, Willmar A. Chulock, J. Beidler Camp, Mrs. Clarence L. Frederick, Mrs. Anne Rickcords Galt, F. Sewall Gardner, Robert A. Gardner, Jr., James R. Getz, Charles Iker, James S. Kemper, Lydon Wild

Sustaining Member

David Fentress

Annual Members

Bruce Adams, James R. Addington, Miss Chryl Barclay, William B. Berger, Dr. Stefan Bielinski, Dr. Arthur A. Billings, Roger M. Cavanaugh, Mrs. Jerome Cerny, Henry E. Cutler, Dr. Steven G. Economou, Paul W. Guenzel, Rembrandt C. Hiller, Jr., William P. Hodgkins, Jr., Dr. Georges Jean-Baptiste, Paul Jorgensen, Reverend Hilary S. Jurica, Richard E. Kleeman, Mrs. Robert Lester, Frank J. McCabe, Jr., Charles Molnar, Harry V. Roberts, Samuel B. Shapiro, Mrs. Minita Trainor, George Woodward

ADULT FILM-LECTURES BEGIN MARCH 7

"An Adriatic Holiday" will open the Museum's 111th series of color films and lectures for adults on Saturday, March 7. The eight programs in the spring series will be given on successive Saturdays during March and April at 2:30 P.M. in James Simpson Theatre of the Museum. The lectures, made possible by the Edward E. Ayer Lecture Foundation Fund, are free.

The schedule for March is as follows:

March 7—Adriatic Holiday
Karl Robinson

March 14—Wild Life in Deep Freeze
Carl Eklund

March 21—Colorado Through the Seasons
Alfred M. Bailey

March 28—Ireland
Willis Butler

A complete schedule of the lectures will appear in the March BULLETIN. A section of the Theatre is reserved for Members of the Museum, and each is entitled to two reserved seats for each program. Requests should be made in advance by telephone (WAbash 2-9410) or by mail. Seats will be held in the Member's name until 2:25 P.M. on the day of the lecture.

SATURDAY PROGRAMS FOR CHILDREN

The Museum's spring series of children's programs will open on March 7 with "Red Riding Hood's Shopping Trip," a lively puppet show staged by the Apple Tree Workshop of Chicago Heights.

The spring series, sponsored by the James Nelson and Anna Louise Raymond Foundation, offers seven free programs to be presented on Saturday mornings during March and April at 10:30 in James Simpson Theatre of the Museum. Again this year the museum will honor various young people's organizations. However, all boys and girls, whether they are affiliated with a group or not, are invited to attend.

Saturday, March 14 will be Cub Scout Day at the Museum. The program scheduled for that day, "Canada, Land of the Mounties," includes three films which carry out the Cub Scout theme for the month of March.

A complete schedule of children's programs will appear in the March BULLETIN.

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Bulletin

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FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WABASH 2-9410

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Members are requested to inform the Museum promptly of changes of address.

JUNIOR 'BEST SELLERS' PUBLISHED FOR CHILDREN

HAVE YOU EVER READ one of Raymond Foundation's "Museum Stories" for children?

"Museum Stories" are printed as four-page leaflets. Each story presents in clear and interesting style a specific subject in anthropology, botany, geology, or zoology. Each of the seven young women of the Raymond Foundation staff who write the stories specializes in one of the four sciences (although all are qualified to lecture in general on any of them in the course of their duties). The stories are illustrated by artists of the Museum staff.

Most of the "Museum Stories" tie in with the subjects of the films on the spring and fall programs for children presented by Raymond Foundation in James Simpson Theatre, and free copies are given to the children who attend. Afterwards the leaflets are published in booklets with attractive covers (booklets contain eight or nine stories and are available at 25 cents each).

"Museum Stories" have received widespread recognition and commendation as valuable supplemental teaching aids from school authorities, parents, and others interested in education. Because of their brevity, attractive illustrations, and pocket format, the stories readily command the attention of the young readers to whom they are addressed and do not encounter the resistance that a formidable-appearing textbook might receive.

Following is a typical example of the text and illustration of a "Museum Story":

ANIMALS OF THE BIBLE

BY MARYL ANDRÉ

In Genesis, the first book of the Bible, we find that the people who wrote the Bible were very much aware of the world around them. They observed and recorded what they could see of the natural world. They saw the differences among animals of the water, the sky, and the land. They could see that some swam, some were airborne, some walked, and some crawled. They watched closely enough to see that each had special habits and that each lived in a special place.

We read in Genesis: "And out of the ground the Lord God formed every beast of the field, and every fowl of the air; and brought them unto Adam to see what he would call them: and whatsoever Adam called every living creature, that was the name thereof." Each man who translated the Bible into his own language used the animal name familiar to him. Many kinds of animals were known by one name (all animals that lived in water were called fish), and one kind of animal may have had many names (cattle were called oxen, cattle, kine, bullocks). We try to understand the animal names in the Bible in terms of what we know of the animal life of ancient times.

The areas populated by the Israelites, at the time of which the Bible tells, included great forests, open grasslands, and trackless deserts. We try to learn the natural history of that part of the ancient world from the stories that have been handed down by word of mouth and eventually written, centuries later, often in story form. Today we base our knowledge on fossils found by digging in the area. We know what animals lived in the Holy Land in one period after another,

(*Continued on page 5, column 2*)

THIS MONTH'S COVER

This Museum is the only place in Chicago where you can now see a giant panda. Since the death of the three giant pandas that have been residents of the Brookfield Zoo, neither Brookfield nor Lincoln Park Zoo has had an animal of this kind. Su-lin, the first zoo resident, came in 1937, died in 1938; Mei-mei died in 1942; Mei-lan lived thirteen and a half years in the zoo (the longest life in captivity of any giant panda on record) and died in 1953. The conflict of political ideologies in today's world has prevented any zoo replacements because of the United States restrictions on imports, including even giant pandas, from behind the Bamboo Curtain of Communist China where these fascinating rare animals live. The habitat group of giant pandas in the Museum, shown on our cover, is composed of specimens collected in 1928 by the late Brig. Gen. Theodore Roosevelt, Jr., and his brother Kermit, while leading the William V. Kelley-Roosevelts Expedition in Central Asia. They were the first specimens, either living or dead, ever to arrive in America. Also on exhibition in the Museum, mounted in lifelike and characteristic playful attitude, is Su-lin.

Drawing by Staff Artist E. John Pfiffner

ANIMALS OF THE BIBLE

LECTURES RANGE FROM EUROPE TO WILDERNESS TRAILS

THERE'S SOMETHING for everyone in the spring lectures and color films to be offered at the Museum on Saturday afternoons during March and April. This, the 111th series provided by the Edward E. Ayer Lecture Foundation Fund, includes not only remote and little traveled areas far off the beaten track, but also the shores of European countries now beckoning to new hordes of travelers as another peak season looms. There are filmed trips to such popular tourist magnets as France, Sicily, and Ireland, as well as the less-known Adriatic coast of Yugoslavia. Those who yearn for hardier adventure where few of their friends and neighbors are likely to turn up will find lectures and films on the most remote of all wildernesses—Antarctica—as well as the faraway Falkland Islands, and the jungles of Venezuela. Still others will favor the films of nature's beauty in the mountains of our own Colorado.

The lectures will be given on the eight Saturday afternoons of the two-month season in the James Simpson Theatre of the Museum. All will begin at 2:30 P.M. Admission is free. For Museum Members and their guests there are reserved seats available. Reservations may be made by mail or telephone (WAbash 2-9410).

Following are dates, subjects and lecturers:

March 7—Adriatic Holiday

Karl Robinson

The traveler over the usual European circuits never sees it, yet the Dalmatian coast of Yugoslavia, where Karl Robinson takes his audience in color-film, is one of the most breathtakingly beautiful regions of the continent. He also covers the fascinating inland regions of the Slovenian, Croatian, Herzegovingian and Macedonian countrysides with their picturesque peoples and a history that goes back until it is enveloped in the mists of legend. The feats of jousting knights of old are revived by skilled horsemen, and ancient legends are relived in the exciting folk dances of the country.

March 14—Wildlife in Deep Freeze

Carl Eklund

From late 1956 until February, 1958, Carl Eklund was scientific leader of Wilkes Station in Antarctica, one of four major U. S. bases in the South Pole area for the International Geophysical Year. In 1939–41 he was one of the principal associates of Admiral Byrd on the U. S. Antarctic Expedition. From these experiences in this eerie region, Eklund has brought a wealth of revealing information and thousands of feet of exciting color film. One of his outstanding exploits was an 84-day trek of 1,260 miles through the unknown over a region described as the most dangerous crevassed area that can ever be encountered.

March 21—Colorado Through the Seasons

Alfred M. Bailey

Here is Colorado at its best. Dr. Alfred M. Bailey, formerly a member of the staff of this Museum and for years a favorite of our lecture audiences, is Director of the Denver Museum of Natural History. His films are packed with beauty and excitement: spring in Rocky Mountain National Park; a pack train trip through the Gore Range for big game; the Black Canyon of the Gunnison; the Garden of the Red Rocks and the Garden of the Gods; Mesa Verde; winter skiing at Steamboat Springs. It's the next thing to making your own trip to this western paradise, and not many people could remain all through spring, summer, autumn and winter to witness the changing vistas which the film brings to its viewers.

RESERVED SEATS FOR MEMBERS

No tickets are necessary for admission to these lectures. A section of the Theatre is allocated to Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WAbash 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock on the lecture day.

March 28—Ireland

Willis Butler

Erin is the land of Willis Butler's ancestors, and in his film he presents comprehensive, beneath-the-surface coverage of all the country, from Cork to Belfast, and from the Aran Islands to Dublin—the geography, history, industry, government, tourist attractions, and the rich human interest and spirit of Ireland. The island's long indented coastline, flanked by mountains and sandy beaches, presents dramatic scenic panoramas. Its position off the western coast of Europe between the Old World and the New enhances the interest of its pre-Christian forts, medieval castles, and ancient abbeys standing side-by-side with modern industrial plants and public buildings. And always close by is a background of peaceful countryside.

April 4—France

Kenneth Richter

France, they say, is everybody's "second country." Also, for years, politically and otherwise, it has been an enigma. To Kenneth Richter, it is the people and their lives that make a country interesting—their history, their art, their culture, their industries. In his film he explains the France of today so well that he was awarded the Detroit World Adventure Series silver popularity trophy. He reviews the beautiful evidence of the periods of France's greatness, and then presents the nation as it is today—still excelling in many arts and specialized industries despite the tribulations through which it has lived.

April 11—Sicily, Island of the Sun

Robert Davis

In sun-drenched color Robert Davis' film surveys this Mediterranean island that was settled by the Phoenicians more than five centuries before the Christian era. Archaeological treasures of the island include the Greek Theatre at Syracuse which was familiar to Plato and Archimedes, and an ancient Roman villa. The Middle Ages are represented by Monreale, an architectural wonder offering a symphony of dazzling Byzantine mosaics, and the medieval village of Erice where Venus ruled over the destinies of gods and women. Modern crafts, arts, music, and dancing of quaint inhabitants are shown along with the strides that modern industry and commerce have made in Sicily.

April 18—The Faraway Falklands

Olin Sewall Pettingill, Jr.

The Falkland Islands are a windswept, treeless land in the far South Atlantic, isolated from the nearest continent, South America, by 300 miles of stormy sea. These islands are the nesting place of some fifty different kinds of birds which flock there in enormous numbers; there are no native land mammals, no reptiles, no amphibians, no obnoxious insects. The only predators on birds are certain other birds. In his color film, Dr. Olin Sewall Pettingill, Jr., brings the absorbing story of the life of winged creatures in this place where they are so dominant. Among the inhabitants are such interesting species as albatrosses, penguins, shags, skuas, Antarctic pipits, ground tyrants, flightless steamer ducks and slender-billed whalebirds.

April 25—Ranch of the Purple Flowers

Robert C. Hermes

In Venezuela there is a vast cattle ranch named "El Hato de Flores Morades" (Ranch of the Purple Flowers). It lies in the great basin of the Orinoco, and the prairie is dotted with palmetto groves and jungles. Many interesting birds, mammals and reptiles make their home there. Robert C. Hermes lived there a long time, recording in color film this interesting wildlife community as well as the life of the ranchers. Among the "stars" of his film are azure blue tanagers, sun bitterns, blue-winged parrotlets, soldier storks, orange-throated chacalacas, scarlet ibises, lizards, exotic butterflies, a strange mammal called the pecuri, and various monkeys.

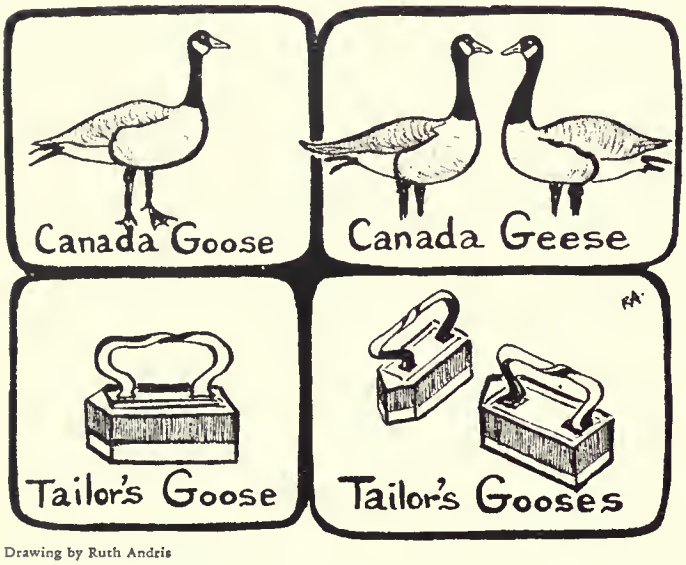
COMMON BIRD NAMES ARE ALL CONFUSED

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

ONE NAME for one bird sounds a lot easier than it is. A European bird which an American would think of as a chickadee is the *great tit* in England; the *Kohlmeise* in Germany; the *Talgmees* in Sweden; the *mesange charbonnière* in France and the *cinciallegra* in Italy. No wonder the scientists of various countries use an international system of naming, whereby the bird is known to all students, irrespective of their nationality, as *Parus major*.

Even people who speak the same language don't use the same name for a bird. The great northern diver, the moorhen, the sand martin and the goldcrest of England become the common loon, Florida gallinule, bank swallow and kinglet of North America.

Even within the United States the same bird passes under different names among country people in different places, despite the standardization that official lists and bird books are bringing. The ruffed grouse may pass as a birch partridge in New England, and as a pheasant in the Carolina mountains; the coot of New England may be a scoter, which is a duck; while the proper coot of the bird books, which is a rail, may pass as a mud-hen.



Drawing by Ruth Andris

"OFFICIAL" BOOK NAMES CHANGE

Not only do English names vary with the locality among country people, but book-conscious bird people of the United States who follow the "official" American Ornithologists Union check-list may have to change some English names with each edition of the list. The duck hawk of the 1931 edition disappears in the peregrine falcon of the 1955 edition; the willow thrush of 1931 in the veery of 1957, and so on, while the earlier Bartramian sandpiper and the prairie hen of the 1895 edition have become the upland plover and a prairie chicken. (In the latter the heath hen has now merged.)

Many birds had no English names when the world was being explored and novelties were being brought in from its four corners. As people began to write and talk about them, we adopted "English" names from a variety of sources: emu and albatross from the Portuguese, cassowary from the Malay, mynah from Hindu, kiwi from Maori, and tinamou from the Indian. For some, book names were coined: rhea from mythology, tropic bird from its habitat, road-runner from its habit, bobwhite from its call, and junco from its scientific name.

That all is not yet plain sailing in the "English name" field can easily be demonstrated by asking an ornithologist the difference between a pigeon and a dove, or between a parrot, parakeet, paroquet and parrotlet.

PLURALS ADD TO CONFUSION

With such confusion as this, no wonder the question of plurals causes some trouble.

Whether or not titmice was the plural of titmouse posed a question that recalled the tailor who, having need of a tailor's goose, decided to order two of them. Unable to make up his mind as to the plural, and as neither two tailor's geese nor two tailor's gooses scribbled on his blotter looked right, he finally begged the question by ordering one, and adding a postscript, "Please send two instead of one."

When I looked up "titmouse" I found that British ornithologists, who are the people that used to use titmouse for the birds we call chickadees, have solved the problem in their current bird books in an unorthodox fashion by begging the question. The word titmouse has nothing to do with the word mouse used for a small rodent. It comes from the Anglo-Saxon *mase*, closely related to the German *meise;* the Dutch *mees*. The prefix tit, meaning small, was then added, so that in Middle English the word became titemase or titmase. Then through a false analogy with mouse it became titmouse. The plural, said Alfred Newton, that noted authority of the last century on things ornithological, is not titmice, but is titmouses. However, when I turn to my unabridged Webster dictionary in my office, I find that the plural is given as titmice. As the word has been chiefly of English usage, I looked in the current British bird books to see what they used. And I found that the word has undergone a further transformation. The British have dropped the mouse, and the small birds are now known as tits; singular, tit. Through a series of transitions over the centuries mase became titmase, became titmouse, and finally became tit.

Unlike titmouse and mouse, the name goose and tailor's goose are related: the big smoothing iron of the tailor gets its name from the shape of its handle being like that of a goose's neck. Yet the plural of titmouse is titmice, while the tailor's goose in the plural becomes tailor's gooses.

Like titmouse and mouse, mongoose and goose are unrelated words; mongoose comes from the *mungus* of a Sanskritic language spoken in Deccan. Yet, while titmouse becomes titmice, mongoose becomes mongooses in the plural. By analogy one would expect moose (for a North American Indian word) in the plural to be mooses, but singular and plural are the same according to my dictionary.

Analogy just doesn't get us anywhere in forming plurals: mouse becomes mice; louse, lice; but grouse does not become grice. Just how wrong one can be in deducing what plurals should be used is well illustrated by a story I heard in the north concerning a whaling captain whose ship was frozen in for the winter in the western Arctic Ocean near Herschel Island, back in the heyday of northern whaling. Here he came into contact with the words lynx and muskox for the first time. The singular and plural he formed as follows: link, lynx; muskok, muskox.

Sports and occupation often have vocabularies peculiar to them, and special ways of saying things. Sportsmen, gunners, hunters and field naturalists, who come into close touch with birds in the wild, and who use their names in everyday conversation, do not form the plural of many bird names as do other, more bookish people, but use the same form for both singular and plural. This has found its way into the dictionaries, as one can check by looking up such words as canvasback, crane, curlew, willet, gannet, grebe, kittiwake and partridge.

From this state of affairs the bird scientist retires thankfully into his ornithology, where the vast majority of birds have only one current name and name changes, when they are proposed, must meet a rigid set of rules and be thoroughly documented.

Brazilian Entomologist Here

Father Francisco S. Pereira, CMF, of the Department of Zoology, Secretariat of Agriculture, São Paulo, Brazil, spent February studying the Museum's collections of scarab beetles. Father Pereira, who is here on a Guggenheim Fellowship, is one of the principal authorities on the classification of the coprine scarab beetles, a group of about 9,000 species that includes the well-known sacred scarab.

NATURE PHOTO CONTEST AWARDS ANNOUNCED

Shown below is one of the top prize-winning entries in the 14th Chicago International Exhibition of Nature Photography held at the Museum last month in co-operation with the Chicago Nature Camera Club.

It is "Fighting Mantid" by Van Davis, of Oakland, California, winner of the first-prize medal for prints in the Animal Life Section.

Other medal winners were: Plant Life Section—Prints, "Shadows," by Henry Soron of Arlington, Massachusetts; General Section—Prints, "Nature's Compass," by John Bajgert, of Chicago; Animal Life—Color Slides, "Swallow Quintet," by Mrs. John E. Walsh, of Beverly, Massachusetts; Plant Life—Color Slides, "Fringed Beauties," by

MEDAL WINNER

"Fighting Mantid" by Van Davis, of Oakland, California, won first prize for prints in the Animal Life Section of the Nature Photo Show held at the Museum last month by Chicago Nature Camera Club.

Raymond E. Schortman, of Easthampton, Massachusetts; General—Color Slides, "Sierra Inferno," by M. G. Smith, of Fresno, California. Special color slide medals, awarded by the Photographic Society of America, went to "Iridescence II," by W. S. Duggan, of Everett, Washington, and "Drosera Rotundifolia," by B. Petersen, of Niagara Falls, New York. In addition, honorable mention ribbons were awarded to 29 others in the Print Division, and to 66 in the Color Slide Division.

This year's contest and exhibition were the largest yet conducted by the Chicago Nature Camera Club. The number of entries was greater than ever before, and the quality of photography submitted compared favorably with past years. Of the 3,640 pictures entered, 3,120 were color transparencies and 520 were prints, including about three dozen large color prints made by the dye transfer process. Numerous entries were received from foreign countries to make the exhibition truly international in scope. The five judges took two days to reach their decisions, yet none of them, in the light of a new day, would deny that among pictures that failed to receive awards were many equal in worthiness to those chosen.

BIBLE ANIMALS—

(*Continued from page 2*)

beginning with Stone Age man right down to the present time.

From piles of bones that have been excavated near altars we know which animals were used by the Israelites for sacrificial purposes. Cattle, goats, sheep, turtledoves, or pigeons without blemish were chosen as offerings.

The Book of Leviticus tells us which animals the Israelites were allowed to eat and which they were not allowed to eat. Some of the ones that they could eat were animals described as cloven-footed and chewers of the cud (cattle, goats, ibexes, antelopes, gazelles), fish with scales and fins, locusts, crickets, and quail. Animals that were forbidden for food were the camel, cony, hare, swine, eagle, osprey, kite, owl, falcon, raven, ostrich, sea gull, cormorant, pelican, vulture, stork, heron, lapwing, and bat. Creeping things were forbidden: the weasel, mouse, tortoise, ferret, chameleon, lizard, snail, and mole. You will notice that the bat is grouped with birds, while both vertebrates and invertebrates are talked about in the same group of "creeping things."

The wild animals known to the Israelites of the Old Testament were those native to Africa and Asia Minor—the lion and leopard, the jackal, cobra, and elephant (not named, but ivory was referred to frequently). The giraffe or "camelopard" was called by the Hebrew word meaning "to crop leaves," a good description of this long-necked leaf-eater. Apes and monkeys were worshipped by the ancient Egyptians.

Some animals were referred to with mythical or romantic names. "Unicorn" is believed to describe the single-horned rhinoceros. The "behemoth" was the hippopotamus, and the "leviathan" was the crocodile.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons by advance request.

GUIDEBOOK TO BIRDS OF CHICAGOLAND

The Museum has just published *Chicagoland Birds—Where and When to Find Them*, a handy pocket-size guidebook with concise text, maps and charts. The booklet was compiled by Mrs. Hermon Dunlap (Ellen Thorne) Smith, Associate in the Division of Birds. Maps and drawings are by William J. Beecher, Director of the Chicago Academy of Sciences.

Each bird listed is keyed to indicate its habitat and the localities where it can be expected to occur most often and in greatest numbers. The key-symbols refer to a section devoted to major birding areas in the vicinity of Chicago. The booklet contains a birding calendar suggesting in general where to look for birds month by month. Visitations have been recorded in the Chicago area of 366 species of birds, the booklet states in a summary of statistical data. There are graphs listing the birds, localities, and seasons of occurrence; opposite each of these are duplicate lists with provision for the entry of detailed records by the bird lovers owning the book.

Copies are available in the Book Shop of the Museum at 50 cents each. Mail orders are accepted.

SECRETS OF THE SEA IN AUDUBON FILM

From the dawn of history man has known the sea, lived by it and on it, but an aura of mystery still surrounds the creatures that exist beneath its surface and along its shores. One of the scientists and naturalists who have devoted their lives to discovering and revealing many of the sea's secrets is Dr. G. Clifford Carl, marine biologist and director of the Provincial Museum of Natural History of British Columbia. Under the auspices of the Illinois Audubon Society, Dr. Carl will lecture, and show his undersea color film "Secrets of the Sea" made beneath the coastal waters of the Pacific Northwest in the James Simpson Theatre of the Museum on Sunday afternoon, March 8, at 2:30 P.M.

Dr. Carl's area of operations extended from the rocky shores of Vancouver Island to the bleak fogbound beaches of the Pribilof Islands of Alaska. His camera caught such intriguing creatures as brilliant orange, yellow and pink starfish, prickly sea-urchins pushing themselves over the rocks by means of their spines and teeth, hermit crabs sparring among themselves, a fearful-looking skate gliding by on its wing-like fins, an octopus slithering through seaweed, fantastic sea-snails, porpoises at play, and whales spouting and diving.

Admission to the lecture is free, and Members of the Museum and their guests are cordially invited to attend.

UPPER LAKES FARMERS AND ARTISTS, 100 B.C.

By GEORGE I. QUIMBY

CURATOR OF NORTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

THE HOPEWELL INDIANS were a prehistoric mound-building people who occupied parts of the eastern United States for more than a thousand years beginning around 500 B.C. Their primary cultural centers were in the central Mississippi, Ohio, and Illinois river valleys. These Indians were farmers, traders, and artists of exceptional ability.

About 100 B.C. some groups of Hopewell Indians entered the Upper Great Lakes region from their cultural center in the Illinois River Valley. Being a riverine people, they traveled up the Illinois River to the Kankakee, then they followed the Kankakee to its

CEREMONIAL JAR

An example of Hopewell pottery in fired clay

headwaters in northwestern Indiana and crossed the portage to the St. Joseph River Valley of southwestern Michigan.

After establishing their settlements and ceremonial centers along the upper Kankakee and lower St. Joseph rivers, the Hopewell Indians went northward in western Michigan, probably first to the Kalamazoo Valley, then to the lower Grand River Valley where they established an important ceremonial center at the present site of Grand Rapids.

Somewhat later, groups of Grand River Hopewellians settled in the valley of the Muskegon River. This was the northernmost occupancy of the Upper Great Lakes region by Hopewell Indians, although in the upper Mississippi region of western Wisconsin other groups of Hopewell Indians had settled even farther north.

OCCUPIED FOREST AREAS

In either case the northernmost occupancy of each region by Hopewell Indians was within a deciduous forest zone which at that time probably was dominated by oak and hickory, but which in historic times was composed principally of maple, beech, birch, and hemlock. The northernmost occupancy of Hopewell Indians in both the Upper Great Lakes and upper Mississippi regions was also limited by climate. They favored a relatively warm climate and did not settle north of the line that in modern times designates a frost-free season of at least 150 days.

This climatic limitation on the Hopewell Indians must have been related to their agricultural pursuits. They made their living by farming and supplemented their food production by hunting and fishing. They raised corn, squash, perhaps beans, and probably tobacco. But corn growing most likely was limited by the climate. It seems probable that in Hopewell times tropical corn had not yet been adapted to growth in cooler regions. Yet by A.D. 1700 Indian corn was being raised on the south side of Lake Superior, well north of the zone of Hopewell occupancy and in an era probably of cooler world climate.

The Hopewell Indians seem to have hunted all of the available animals, particularly deer. The animals available included all or nearly all of those still found in the region when the first Europeans arrived about a thousand years after the end of Hopewell culture. The only domesticated animal of the Hopewell Indians was the dog.

PHYSICAL TRAITS REVEALED

The physical appearance of the Hopewell Indians can be reconstructed from their skeletons and some small sculptured figures found in their burial places. These Indians were of medium height and long-headed or medium long-headed. The figurines suggest that they were stocky or plump, particularly the women, with oval faces and "slant" eyes.

The men wore breech cloths of animal skin or woven fabric and the women wore wrap-around skirts of woven cloth or skin. Both men and women wore slipper-like moccasins, probably made of animal skin. The women seem to have worn their hair long in back but parted in the middle on top of the head and drawn back above the ears. Men removed some of their hair leaving a forelock in front and long hair gathered into a knot at the back of the head.

Their dwellings probably were types of wigwams, round or oval in plan with dome-shaped roofs, made of saplings covered with bark, mats, or skins.

Their villages and ceremonial centers were always along rivers. They erected large conical or dome-shaped mounds of earth over the dead and built earthen walls enclosing large areas that were circular, oval, or rectangular.

GRAND RAPIDS SITE

The largest Hopewell ceremonial center in the Upper Great Lakes region was at the present site of Grand Rapids, Michigan. Near the center of town on the west side of the Grand River there formerly stood a group of about 30 to 40 mounds, the largest of which was at least 30 feet high and 200 feet in circumference. On the opposite side of the river about two miles south of the city there is a group of 15 mounds the largest of which is 15 feet high and about 100 feet in diameter. There once seems to have been associated with this mound group a large rectangular enclosure with low walls of earth.

A Hopewell site in the St. Joseph River Valley, at which there was a group of nine mounds, was associated with an enclosure about 80 feet wide and 110 feet long, shaped like a horseshoe. The walls of earth have disappeared but the outline of the enclosure still shows in aerial photographs. In the Ohio Hopewell center there are many very elaborate earth wall enclosures constructed by the Indians.

During a part of each summer some groups of Hopewell Indians left their settlements on the rivers and moved to the shore of Lake Michigan. These summer campsites were always located in sheltered hollows among sand dunes, usually in areas of land between Lake Michigan and an inland lake or river estuary. Food refuse collected from one of these sites included remains of bear, beaver, deer, wolf, muskrat, rabbit, large-mouth bass, channel catfish, sheepshead, painted turtle, and mussel.

ENGAGED IN TRADE

The Hopewell Indians made great use of exotic raw materials for the manufacture of tools, weapons, ornaments, and objects used in religious ceremonies. To obtain these raw materials they engaged in widespread trade and commerce.

From the Rocky Mountain region of the Far West they obtained obsidian for their ceremonial blades and grizzly bear teeth for ornaments. Large marine shells they got from the South Atlantic coast and the Gulf of Mexico. Copper and silver came from the mines in the western Lake Superior area, and mica sheets came from the Middle Atlantic coastal region. Galena or lead was brought into the Upper Great Lakes region from Missouri and northwestern Illinois.

Tools and weapons were made of copper, stone, and bone. There were ungrooved axes of copper and polished stone; awls of

HOPEWELL EAR ORNAMENTS

Spool-shaped, they are fashioned of copper

bone, antler, and copper; corner-notched projectile points of chipped flint; knives of chipped flint and obsidian; needles of bone and copper; small flake knives; large ceremonial blades of chipped flint of unusual coloring; graving tools of stone, beaver in-

cisors, and copper; and scrapers and drills of chipped flint.

The Hopewell Indians had musical instruments. Most characteristic were panpipes consisting of three or four conjoined tubes of bone or reed, graduated in length, and bound together with a broad, flat, encircling band of silver or copper. They also had rattles of various kinds including some made of turtle shell and they probably had drums.

STONE TOBACCO PIPES

Tobacco pipes made of polished stone were of the platform type with a bowl centered on a platform and a stem hole from one end of the platform to the bowl. Most such pipes were simple, symmetrical, curved base platforms with spool or barrel-shaped bowls. Some were elaborate effigy forms with bowls

COPPER AXES

Preserved on them by copper salts are the imprints of textiles made by the Hopewell Indians.

carved realistically in the form of animals and humans. One such pipe had a bowl carved in the form of a bear, another had a bowl in the form of a nude woman seated on the platform. Still another pipe with two bowls had a platform carved to represent an alligator.

The Hopewell Indians had fine pottery and utensils. There were spoons made of notched mussel shells and probably of wood. Large dippers or containers were made of imported marine shells.

Pottery was of several styles. There was a utilitarian ware consisting of round or conoidal based jars made of fired clay tempered with particles of granitic stone and covered on the exterior with the imprints of a cord-wrapped paddle. A characteristic Hopewellian ware similar in paste and form to the ware just described differed in that the exterior surface was smoothed and then decorated with bands and zones of rather thick dentate stamp impressions.

FIRED CLAY POTTERY

The finest pottery ever found in the prehistoric Upper Great Lakes region was the Hopewell ceremonial ware made of fired clay tempered with small particles of limestone. Characteristic of this type were small quadrilobate jars with flat bottoms. The smooth gray surfaces of such vessels were decorated with contrasting body zones filled with closely spaced impresions of a fine toothed dentate stamp rocked back and forth. The rims were decorated with a band of fine cross-hatching. This pottery probably was made only for burial with the dead.

Some other Hopewell pottery types seem to have been copies of this fine ceremonial ware. These types, represented by jars with round or flat bottoms and bodies that frequently were quadrilobate, were made of fired clay tempered with particles of granitic stone. Some of this pottery was relatively plain, but most of it was decorated with curvilinear zones filled with curved zigzag lines or punctate impressions.

Ornaments of the Hopewell Indians were made of metal, shell, bone, and stone. Beads for necklaces were made of copper, river pearls, marine shell, and the canine teeth of bears. Spool-shaped ear ornaments of copper were on some occasions worn at the wrists. There were armbands of silver and probably of copper. Pendants and breast ornaments included those of polished stone, copper, perforated and cut animal jaws, bone and copper effigies of animal teeth, perforated eagle claws, and bear canine teeth inlaid with river pearls. Pieces of imported sheet mica may have been used as ornaments or mirrors.

WOVE CLOTH WITH FINGERS

The Hopewell Indians wove cloth by means of finger techniques rather than a loom. Twining was the most common method of weaving. Thread was twisted by hand from bast fiber—the soft inner bark of certain trees.

The Hopewell Indians were the outstanding artists of the Upper Great Lakes region and their products were never surpassed by the Indians who lived in the region in later times.

The elaborate effigy forms made of sheet copper and mica, the complicated geometric forms in copper made probably from folded patterns, and the delicate engraving on bone, shell, and wood so characteristic of the Ohio Hopewell center were lacking in the Upper Great Lakes region. But the other art forms were present, particularly sculpture in stone and bone portraying human beings, animals, birds, fishes, reptiles, and insects. Probably all of Hopewell art had religious and ceremonial significance.

Hopewell art and material wealth were lavished on the dead, probably with elaborate ceremonies. Deceased people of high rank were buried in subfloor pits or tombs, sometimes lined with bark or logs. Tools, weapons, utensils, pottery, pipes, and ceremonial objects, all of excellent quality, were placed in the grave. Bodies were placed in an extended or a flexed position. Bundles of bones, probably from partly decompressed bodies that had been on burial scaffolds, were also placed in grave pits.

When the burials were completed large mounds of earth were erected over the grave pits. These mounds were conical or dome-shaped. It is likely that only individuals of high social position, such as priests and chiefs or members of ruling families, were given mound burial.

SOCIAL ORGANIZATION

The Hopewell Indians must have had a social organization that included class structures, heriditary ranks and privileges, divisions of labor, ways of organizaing co-operative work projects, such as the building of mounds and enclosures, and means for individuals to become specialized as artists, traders, metal workers, and the like. This social organization, whatever its actual details, was much more elaborate than that of any of the earlier prehistoric groups of Indians in the Upper Great Lakes region.

The period of Hopewell culture in this region was from about 100 B.C. to A.D. 700. This dating is derived from cross-ties between the ceramic stratigraphy in the Upper Great Lakes region and that of the Illinois Valley Hopewell center where there is an adequate number of radiocarbon-dated sites.

'SEAGOING JOURNEY' AWAITS CHILDREN

A new Journey for children at the Museum begins March 1, and will be available to child visitors every day through May 31. The subject is "Life of Ancient Seas." Children "signing aboard for this cruise" will receive their "seagoing orders" and "charts" at either the north or south entrance of the Museum, and with these "navigation instructions" will find their way to exhibits that will give them the answers to such questions as:

"What animals lived in the seas before fish?"

"Were there once coral reefs in the Chicago area?"

"Are 'sea-lilies' plants or animals?"

"When did giant 'sea scorpions' 11 feet long live?"

"Name the flesh-eating swimming reptiles that were larger than any of the dinosaurs."

Children who complete this and three other Journeys are certified as Museum Travelers; for eight Journeys they are designated Museum Adventurers, and for 12 they become Museum Explorers.

Spring Visiting Hours Begin at Museum

Beginning March 1, spring visiting hours will go into effect at the Museum. The building will be open from 9 A.M. to 5 P.M. every day, an extension of one hour over the winter hours. On May 1 there will be another extension, when summer hours, 9 to 6, go into effect.

CHILDREN'S PROGRAMS ON SATURDAYS

A puppet show and six movie programs will be presented for children at the Museum on Saturday mornings at 10:30 during March and April. Saturday March 28, will be skipped because of the Easter weekend.

This spring series of entertainments is the offering of the James Nelson and Anna Louise Raymond Foundation. The programs will be given in the James Simpson Theatre.

Although five of the shows have been designated as special days for various children's organizations, *all* children, regardless of whether they are affiliated with these organizations or not, are welcome at *all* programs. They may come alone, in groups, or with parents or other adults. Admission is free, and no tickets are needed.

Following is the schedule:

March 7—Red Riding Hood's Shopping Trip

Puppet stage production by Apple Tree Workshop of Chicago Heights

March 14—*Cub Scout Day*

Canada—Land of the Mountles

March 21—*Museum Traveler Day*

African Big Game

March 28—NO PROGRAM—*Easter weekend*

April 4—*Camp Fire Girl Day*

Tree Finder

(How to know your trees; narration by Marie Svoboda)

April 11—*Y.M.C.A. Day*

Prehistoric Life

April 18—*Girl Scout Day*

Westward Ho!

April 25—Venezuelan Venture

(Wildlife in plains and jungles; narration by Robert C. Hermes)

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology

From: Arizona State Museum, Tucson, Ariz.—86 sherds; Mr. and Mrs. Paul Blackwelder, St. Louis—10 clothing items, Polynesia; John J. Cella, Glen Ellyn, Ill.—shrunken head, Ecuador; Allen Liss, Chicago—carved spoon, Philippines; Miss Hedwig H. Mueller, Chicago—24 textiles, 2 Cuna blouses, 2 belts, Guatemala, Panama, Ecuador; Mrs. Evelyn Riley Nicholson, Chicago—man's gown, China; Mrs. I. Newton Perry, Chicago—snail shell kilt, Vabau Islands, Tonga Group; George I. Quimby, Chicago—Eskimo clothing, art objects, etc., Belcher Islands, Hudson Bay; Mrs. Irwin Rew, Evanston, Ill.—12 ethnological specimens, Northwest Coast; William H. Wehrmacher III, Morton Grove, Ill.—chipped stone scraper

Department of Botany

From: Holly Reed Bennett, Chicago—662 phanerogams, Wisconsin; Bernice P. Bishop Museum, Honolulu—3 herbarium specimens; Dr. Harold C. Bold, Austin, Tex.—3 type specimens of algae, Tennessee; California Academy of Sciences, San Francisco—herbarium specimen; Dr. C. M. Palmer, Cincinnati—12 specimens of algae; Dr. E. E. Sherff, Hastings, Mich.—119 vascular plants, Hawaii

Department of Geology

From: University of Chicago—collection of fossil reptiles, Texas, lower jaws of fossil reptile, Montana; Dr. Richard Konizeski, Missoula, Mont.—29 Oligocene mammals, a lizard scale; Dr. and Mrs. Robert H. Whitfield, Evanston, Ill.—fossil plant specimens

Department of Zoology

From: University of California, Los Angeles—53 lots of fishes; Dr. William E. Duellman, Detroit—a lizard, Mexico; Dr. Robert L. Fleming, Kathmandu, Nepal—184 bird skins, 5 frogs, 13 snakes; Harry Hoogstraal, Cairo, Egypt—8 snakes, 25 lizards, 35 bats, 32 bird skins, Egypt, 40 bird lice, Wales, England; Dr. N. L. H. Krauss, Honolulu—15 reptiles and amphibians, Malaya, Hong Kong, Formosa, Japan; Museum and Art Gallery, Durban, Natal, S. Africa—a birdskin; Providence High School, Chicago—horse skull, human skull, articulated skeleton of human hand

STAFF NOTES

Dr. Theodor Just, Chief Curator of Botany, was host to a meeting in the Museum of the program committee, Section II, Paleobotany, of the 9th International Botanical Congress which is to be held in Montreal in August. Present were: Dr. N. W. Radforth, of McMaster University, Hamilton, Ontario; Dr. Wayne Fry of the University of California, Berkeley; Dr. R. M. Kosanke, of the Illinois Geological Survey, Urbana; and Dr. J. M. Schopf, of the U. S. Geological Survey, Columbus, Ohio. . . . **Dr. C. Earle Smith, Jr.,** Associate Curator of Vascular Plants, spoke at a seminar of biological sciences at Northwestern University. His subject was "Changing Concepts in Systematic Botany, 1800–1900." . . . **Mrs. Meta P. Howell,** Librarian, and **Mrs. M. Eileen Rocourt,** Associate Librarian, attended the midwinter meeting of the American Library Association held in Chicago. Mrs. Rocourt, as vice chairman of the Museum Division of Special Libraries Association, represented the division at the association's Advisory Council meetings in Highland Park. . . . **Loren P. Woods,** Curator of Fishes, lectured before the Isaac Walton League in Hinsdale.

NOTED SWISS BOTANIST DIES

Prof. Georges Hochreutiner, Corresponding Member of this Museum, Honorary Director of the Musée, Conservatoire et Jardin Botaniques, and Honorary Professor of the University, Geneva, passed away on January 29, in his 86th year.

Prof. Hochreutiner made a number of extensive botanical journeys through the Near East and later, around the world. He became well known for his writings on the tropical floras of Madagascar and the East Indies, and specialized in the taxonomy of the Mallow family (Malvaceae).

Chicago Natural History Museum's type photograph collection contains photos of thousands of type specimens of tropical American plants on deposit in the Conservatoire in Geneva, and obtained during the administration of Prof. Hochreutiner.

NEW MEMBERS ADDED TO MUSEUM ROLLS

(January 19 to February 17)

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William V. Kahler

Associate Members

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Sustaining Member

Dr. Sam W. Banks

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THE BULLETIN

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Members are requested to inform the Museum promptly of changes of address.

MEMBERS' NIGHT SET FOR MAY 8

MEMBERS' NIGHT this year will be held at the Museum on **Friday, May 8.** All Members are invited, and any guests they care to bring will be welcome.

Growth and progress in the Museum program will be the theme of the evening. The Department of Anthropology will present a special exhibit, "Panorama of the Pacific," in Stanley Field Hall as a preview of selected objects from the vast Fuller collection, one of the world's most important assemblages of artifacts representing the peoples of the South Seas. The collection was recently acquired by the Museum from Captain A. W. F. Fuller of London (BULLETIN, *September, 1958, page 3*). On view also will be various other new anthropological exhibits, notable among which are a display of objects from western Mexico in Hall 8, and the exhibit in Hall H graphically detailing answers to the question, "What Is Primitive Art?"

Another feature of Members' Night will be the reopening of Charles F. Millspaugh Hall (Hall 26—North American Trees), in which both the hall and the exhibits have been completely remodeled and refurbished. Visitors will see the nearly completed reinstallation of the meteorite section of Clarence Buckingham Hall (Hall 35—Moon, Meteorites and Minerals). The Museum's collection of these visitors from outer space is one of the largest in the world. In the Department of Zoology, visitors who have not been in the Museum for some time will find new exhibits added to various halls.

A special exhibit of drawings and paintings based on Museum exhibits, the work of students from the School of the Art Institute of Chicago during the past year, will be found in Albert W. Harris Hall (Hall 18).

As on Members' Nights in past years, one of the principal attractions will be the "Open House" atmosphere in which members and their guests are invited to visit the laboratories, studios, workshops and offices of the Museum staff on the ground floor and the third and fourth floors—areas to which visitors normally are not admitted. In these quarters they will meet the men and women whose joint efforts and highly specialized skills make possible the Museum's missions of the discovery and dissemination of knowledge. Present will be the curatorial staff who conduct scientific research and man expeditions to far parts of the world. Also on hand, many of them demonstrating their unusual techniques and arts, will be the taxidermists, artists, artist-preparators, technicians, librarians, editors, and others.

Open house hours will be from 7 to 10:30 P.M., but the doors of the building (both North and South entrances) will open at 6 for the convenience of visitors who wish to dine in the Museum Cafeteria, where dinner will be served from 6 to 8 P.M. at the customary prices.

At 9:30 P.M. there will be an informal reception in Stanley Field Hall, and light refreshments will be served. President Stanley Field, Director Clifford C. Gregg, and other Museum officials will be on hand to greet visitors.

For Members and their guests who arrive by private car, ample free parking space is available at the north entrance. Special motor-bus service has been arranged to accommodate those who do not wish to drive their own cars. A free shuttle-bus, marked to indicate that its destination is the Museum, will leave Jackson Boulevard and State Street at 15-minute intervals, beginning at 6:30 P.M. Intermediate stops will be made at Jackson and Michigan Avenue and at Seventh Street and Michigan. The last bus, city-bound, will leave the Museum at 10:45 P.M.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

THIS MONTH'S COVER

"The Mineralogist" on our cover is a caricature which appeared in a 19th century print. At the time, mineralogy was still in its infancy, and the artist's conception of one of its practitioners symbolizes his profession by garbing him in an armor of minerals—calcite, malachite, hematite and quartz. The artist's creative throes drove him even further into fashioning the man's hands of twin quartz crystals terminated by pyramids forming his fingers. The mineralogist is depicted as making an analysis of a mineral by the blowpipe method. This method, which is still used, is one of the oldest and one which requires the least variety and amount of reagents. In this analysis, a substance is studied by noting its characteristic behavior with respect to flame coloration, fusibility and formation of volatile coating when a suitable reagent in it is exposed to a blowpipe flame. The picture was selected for our cover as being appropriate to the article on page 3 by Albert W. Forslev, Associate Curator of Mineralogy.

MOVIES FOR CHILDREN CONTINUE IN APRIL

The last four of the Raymond Foundation's spring series of Saturday morning movie programs for children will be given in April. These entertainments begin at 10:30 A.M., and are presented in the James Simpson Theatre of the Museum.

Although three of the shows have been designated as special days for various children's organizations, *all* children, regardless of whether they are affiliated with these organizations or not, are welcome at *all* programs. They may come alone, in groups, or with parents or other adults. Admission is free, and no tickets are needed.

Following is the schedule:

April 4—*Camp Fire Girl Day*
Tree Finder
(How to know your trees; narration by Marie Svoboda)

April 11—*Y.M.C.A. Day*
Prehistoric Life

April 18—*Girl Scout Day*
Westward Ho!

April 25—Venezuelan Venture
(Wildlife in plains and jungles; narration by Robert C. Hermes)

NEW EXHIBITS SHOW RAPID PROGRESS IN MINERALOGY

By ALBERT W. FORSLEV
ASSOCIATE CURATOR OF MINERALOGY

THE NEW Hall of Minerals (Clarence Buckingham Hall—Hall 35) is designed to represent the rapid progress that has been made in the field of mineralogy since the turn of the century. Before discussing the new hall it may be interesting first to examine the historical development of these views.

'MINERALOGY'—A MEDIEVAL CONCEPT

In this old lithographic print, Justitia, Roman goddess of justice, with a scale in her lap, pointing her scepter at a young Roman, is apparently presiding over "Mineralogy," consisting of not only minerals but rocks and fossils. No distinction was made during the Middle Ages between different classes of natural objects.

Although extensive physical evidence exists regarding early man's use of rocks and minerals in the fashioning of tools and weapons, we know but little about his views on their origin and composition. One of the first written records we have is by Aristotle (384–322 B.C.) in his *Meteorologica* in which he briefly commented on the subject. He proposed that minerals were formed in the earth under the influence of rays given off by the sun and other heavenly bodies. The rays were believed to give rise to certain types of vapors which reacted with the elements to form stones of various kinds. According to him there were four basic "elements": fire, air, earth and water. The properties of minerals were determined by the relative proportion of each of these elements present. Metals were believed to consist mainly of the elements earth and water, perhaps because they became fluid when heated and were malleable when hammered. "Fossils" such as sulfur and realgar were believed to be composed chiefly of the elements fire and earth. The term "fossil," derived from the Latin word *fossilis*, meaning a thing dug up from the earth, was used in literature as late as the 19th century to apply to minerals, rocks and fossils, and no distinction was made between the three classes until the individual sciences of mineralogy, petrography, and paleontology came into being.

From Aristotle's time up until about the 16th century, little original work was done in the field of mineralogy. The medieval writers who largely drew their ideas from Pliny's *Natural History* (A.D. 77) and the writings of Theophrastus (370–287 B.C.) were concerned primarily with the medicinal and mystic properties of minerals; and the scientists of the same period, it seems, were interested only in controlling these magical powers. Aristotle's explanation of the origin of minerals was universally accepted for almost two thousand years, finally to be replaced by two other theories which successively came into prominence. The first of these likened the mineral kingdom to the plant and animal kingdoms and even assumed that the two sexes were involved in the formation of minerals. The assumption was based on the idea that minerals had a life cycle and that they originated from a seed, grew to maturity and frequently decomposed or altered: the equivalent of disease in the animal and vegetable kingdoms. This postulation, popular during the 16th and 17th centuries, gradually gave way to "The Theory of the Lapidifying Juice," which in many respects was the forerunner of modern theories and represented a distinct advance toward a true solution. According to this concept, a universal fluid circulated throughout the earth depositing mineral matter in pores, cracks, and other openings in the rock and soil composing the earth.

The advent of extensive mining activity in central Europe during the 15th and 16th centuries generated widespread interest in minerals. The development of mining in the Schneeberg district of Saxony in 1420, at Annaberg in Saxony in 1495, in Joachimsthal in Bohemia about 1520, and at Andreasberg in the Hartz around 1570, brought natural scientists into greater contact with minerals than ever before. They began to pay more attention to the physical properties of minerals and in doing so laid the basis for today's systems of classification. The most important contributor to mineralogy during this period was Georgius Agricola (1494–1555) who, as the city physician of the great mining towns of Joachimstahl in Bohemia, and Chemnitz in Hungary, spent most of his life in close association with miners, mines and minerals. He was one of the first naturalists who relied on personal observation and research in the study of minerals and is rightfully called "The Father of Mineralogy." His *De Natura Fossilium*, published in 1546, is considered to be the first textbook on mineralogy. In it he described many new minerals and presented a classification based on physical properties such as specific gravity, color, hardness and luster.

From this time on, there was a rapid development of mineralogy as a science, and with the advent of chemistry in the 18th century new systems of classification utilizing the chemical composition of minerals were introduced. One of the most important contributors to the field during this period was Abraham Werner (1750–1817), whose system of classification using both physical and chemical properties of minerals was in use throughout Europe at that time. Almost concurrently, the Swedish chemist Jons Berzelius (1779–1848) determined the molecular weights of some 2,000 compounds and developed for the first time a chemical classification of minerals. Another contributor of equal importance, and a contemporary of Werner, was René-Just Hauy (1743–1821), a French botanist-mineralogist, who helped found the science of crystallography. He developed the basic ideas relating the crystal form and cleavage of a mineral to its molecular structure.

RECLASSIFICATION ESTABLISHED

One of the most famous mineralogists of the 19th century was James Dwight Dana, who removed much of the confusion that existed, and clarified the classification of minerals. His *System of Mineralogy*, first published in 1837, is a classic and contains a wealth of information of acknowledged excellence. Although the first two editions (1837 and 1844) used a Latin nomenclature along the lines of botany and zoology and a

classification based on the external features of minerals, he completely rejected this approach in his later editions (1850, 1854, and 1868) and followed a chemical classification. The work was continued by his son Edward S. Dana, with a sixth edition in 1892.

With the discovery of X-rays by Roentgen in 1895 and work by E. von Laue and Sir William Bragg in 1912 on the diffraction of X-rays by crystals, a new era in mineralogy began. For the first time it became possible to determine the arrangement of atoms within a substance. The relationship between chemical composition, atomic structure and external crystal form has been determined for many minerals and continues to be a major field of research in mineralogy. The information obtained so far has been used to set up a modern system of classification based on these properties and has resulted in the publication of the seventh edition of *Dana's System of Mineralogy*. This new work in three volumes contains detailed information and data for almost 2,000 minerals. The first two volumes have been published, and the third, dealing with the silicates, is in preparation.

SCOPE OF EXHIBITS

In the new Hall of Minerals, hundreds of specimens, models and illustrations are used to depict the present day ideas on the physical-chemical composition, formation and classification of minerals. The mineral specimens displayed include common and rare species collected from many parts of the world.

The arrangement of the hall follows, in general, a chemical classification based on the seventh edition of Dana's *System of Mineralogy*. Minerals of simple chemical composition such as native elements and sulfides are exhibited near the east end of the hall, and the complex silicate minerals at the west end. Within the individual exhibits, the minerals are arranged according to their chemical formula and crystal structure. Models and diagrams are used in conjunction with crystals of various minerals to illustrate the manner in which the external crystal form reflects the atomic structure.

The Chalmers Crystal Collection, housed in four special exhibition cases, is used to illustrate the classification of minerals and crystal forms, the difference between minerals and rocks, and the physical properties of minerals, such as hardness, color, streak, cleavage and luster.

NOTEWORTHY SPECIMENS

Throughout the hall many impressive specimens are to be seen. Some are exhibited in specially built niches because of their large size. Among them are a 312-pound block of lapis lazuli recovered from an Inca grave in Peru, two exceptionally large selenite crystals, and a spectacular wulfenite cluster showing a delicate network of golden crystals.

Several exhibits are devoted to uncommon features of minerals such as twin crystals, where two or more individuals have symmetrically intergrown; and phantom crystals, where because of interruptions during the growth of a crystal, outlines of its crystal form are preserved in its interior. Another exhibit is devoted entirely to pseudomorphs: minerals that have taken the crystal form of another through substitution or alteration.

The Hall of Minerals will present to the visitor an interesting introduction to the members of the Mineral Kingdom and the concepts of the mineralogist living almost 2,300 years after Aristotle.

Books

A FIELD GUIDE TO REPTILES AND AMPHIBIANS of the United States and Canada East of the 100th Meridian. By Roger Conant, illustrated by Isabelle Hunt Conant. 366 pages, 40 color plates, 62 figures, 248 maps. Houghton Mifflin Co., Boston. $3.95.

This twelfth volume of the Peterson field guides is an outstanding contribution to the study of the natural history of the eastern United States and Canada. It is a little appreciated fact that the amphibian and reptilian fauna of this region is one of the richest in the world, even rivaling many teeming areas of the tropics. Thus the Conants took on a man-sized job in preparing this guide and have been remarkably successful.

Every species (and many important races) of crocodilian, turtle, snake, lizard, salamander, frog, and toad occurring east of a line drawn from central Texas to central North Dakota and Manitoba is illustrated—266 in color and 117 in black-and-white. The distinctive characteristics of each animal are indicated on the portraits by short black lines, a helpful technique associated with the Peterson series. In addition, a short text passage devoted to each species describes the animal in greater detail, comparing it with other, superficially similar, species. These aids to identification are supplemented by ingenious drawings of certain features that are difficult to illustrate in a portrait. With the help provided by this guide, every interested person should be able to identify most of the amphibians and reptiles found in the area covered.

The word "most" is used in the preceding sentence for two reasons. In the first place, no key or other aid to identification can possibly anticipate all of the possible freaks of nature that may be spewed up from time to time. In the second place, the interrelationships of some species are so complex that even the professional biologist is not sure exactly where one species ends and another begins. The pond and river turtles known locally as "cooters" and "sliders" form the outstanding example in our fauna of such a complicated group, and they have done more to teach American herpetologists humility in the face of the complexities of nature than any other element of our reptilian fauna.

Within the space limitations of a "guide," the text of the Conant book contains a surprising amount of information not directly concerned with identification. Besides giving the distinguishing features, the text for each species mentions the characteristic habits and habitats, and includes notes on the food and breeding habits, plus, in the case of frogs and toads, a description of the voice. The book also includes sections on the collection and care of captive animals and on the treatment of snake bite. Consequently, quite apart from the attraction of the colored plates, this book has much to recommend it and will be equally useful to the eager Boy Scout, the interested traveler, and the professional herpetologist. At $3.95 it represents one of the best bargains for the natural history library I have seen in a long time.

ROBERT F. INGER
Curator of Amphibians and Reptiles

BRITISH MAMMALS. By Maurice Burton. Oxford University Press (1958), 64 pages, illustrated. Price $2.75.

The restrictive title of this book should not deter anyone who wants to learn about mammals. The author explains in simple layman's language what mammals are, how they get about, eat, sleep, keep house, court, rear young, defend themselves, play, and express emotions. Animals that perform the biological functions described here can be found in any woodland, but the author lets the universally familiar animals of the British landscape play the roles.

Little space is devoted to purely technical descriptions. When the author mentions an anatomical character, it is for the purpose of explaining how and why it helps the animal live. The style of the book is simple and direct. The text is factual and devoid of the whimsy and studied cuteness that often creep into books for beginners. The numerous line-drawings are skillfully executed and so cleverly conceived that they convey their message without the aid of text. The author not only answers the first scientific questions the novice asks, but he goes on and answers those that would logically follow.

The student and amateur naturalist in the American Middle West will find this little book just as enlightening, satisfying and stimulating as will his British counterpart.

PHILIP HERSHKOVITZ
Curator of Mammals

A reproduction of a flowering branch of the mountain camellia (*Stewartia pentagyna*), a showy member of the tea family, has been added to Martin A. and Carrie Ryerson Hall (Plant Life—Hall 29).

HOW MUSEUM AIDS POLICE IN CRIMINAL INVESTIGATION

By PATRICIA McAFEE
ASSOCIATE EDITOR

SINCE LT. JOHN ASCHER, Director of the Chicago Police Department's Scientific Crime Detection Laboratory, discovered the Museum several years ago, scientists here have been working in what might be considered a strange or at least unusual capacity—assisting in criminal investigations.

Finding a natural scientist in the field of criminal investigation is not really so strange when methods of scientific research are considered. Scientists are continually searching for new knowledge to add to the old. They make observations and accumulate facts, piece the facts together, interpret them and sometimes fill in voids from knowledge of the past, in order to determine what happened years ago, what is evolving today, and what might evolve in the future.

FIGHTS CRIME WITH SCIENCE

Lt. John Ascher at his desk as Director of Chicago Police Department's Scientific Crime Detection Laboratory. In a number of cases members of the Museum staff have assisted Ascher and his associates in identifying physical evidence.

Methods of procedure in criminal investigation are somewhat similar. Evidence must be collected, examined and interpreted to reconstruct crimes which took place in the past.

Of course, neither scientific research nor criminal investigation is as simple as these brief statements might suggest. Both take hours of painstaking work, but in criminal investigation, time is at a premium. It is not always possible to take hours to try endless experiments in an attempt to identify a piece of evidence.

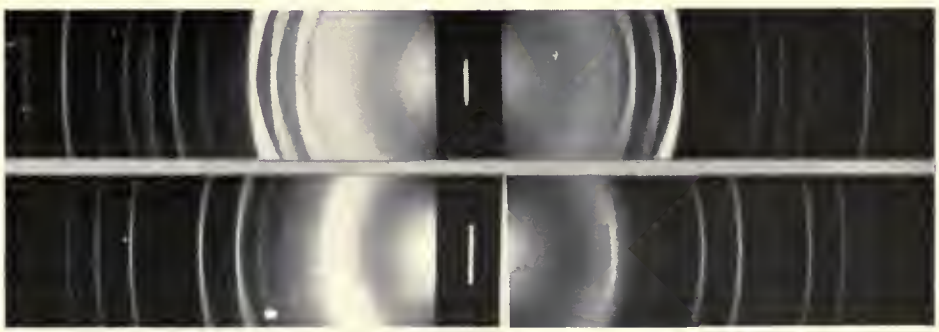
PHYSICAL EVIDENCE

The men at the Crime Laboratory are experts in their field, but it would be practically impossible for them to have a scientist's knowledge of all the things that appear in criminal cases as physical evidence. Because of the critical importance of the work, experts are consulted whenever possible. It is in the identification of physical evidence that experts at the Museum assist the Crime Lab.

Shortly after a crime has been discovered and the police have reached the scene, the physical evidence is collected. In more fortunate instances the evidence may be a personal belonging of the criminal himself or something as conclusive as a fingerprint. But, unfortunately, this is not always the case; the evidence may be a footprint in the mud, a hair or hairs from an attacker, or trace materials from a piece of clothing. At a "sterile scene"—a scene cleared of incriminating evidence—there may be nothing suggesting the offender, but only microscopic matter that might aid in determining where the crime was committed.

The evidence is often natural, such as plant matter, mineral particles from soils, animal products, the living animal or effects of the living animal. Therefore, natural scientists are called upon for help when necessary. Physical evidence is vitally important, as it sometimes can decide the innocence or guilt of a man and it is essential that it be examined carefully and thoroughly. Often there is little enough evidence, making it doubly important that what there is be fully explored.

Steel filings, particles of powder from an explosion, paint, glass fragments, stomach contents, traces of soil, pollen, etc., are all possible clues that may link the perpetrator with the crime or determine the scene where the crime was committed. Soil is frequently valuable because it can disclose whether a person was or was not at a specific place.



DETECTION BY DIFFRACTION

X-ray diffraction photographs of quartz (top) and plaster of paris (bottom) illustrate how different substances can be identified, for use as clues, by their characteristic X-ray patterns.

The Museum's X-ray diffraction unit, which in scientific research is used primarily for the identification of minerals, has been used to identify soil specimens and other chemical compounds for the Crime Lab. X-ray diffraction methods give reliable quantitative and qualitative analyses of nearly all chemical compounds. The Museum's X-ray spectrograph has also been used in analyzing materials for the Crime Laboratory. This instrument differs from the diffraction unit in that it determines which chemical elements are present in a substance. The X-ray techniques mentioned are generally superior to ordinary chemical analyses because they identify without destroying the evidence, which may be needed for court testimony.

One case in which the diffraction unit was especially valuable in solving the crime was reported by Lt. Ascher. A man had murdered his wife, carried her body away in his car and dumped it in an alley. The soil later taken from his shoes and from the brake pedal of his car was identical with the soil in the alley where the body was found.

Careful analyses of soil, grease, dirt, paint and other substances may lead to the discovery of the perpetrator of the crime, as in the case mentioned, or they may be useful in determining whether the substance was introduced at the site where the body was found, or if it was on the body before death. Analyses can indicate also that the substance came from another place, suggesting that the crime was not committed at the location where the body was discovered.

Imagine that a body is found in a warehouse outside the city. Boxes and tools are strewn about the room giving the impression that some sort of struggle had taken place. A preliminary investigation fails to reveal any apparent clues—the victim's shoes are clean; there is nothing actually signifying that the murder was committed in the warehouse. An intense investigation reveals traces of pollen on the victim's clothing. The killer had murdered elsewhere, cleaned the victim's shoes and hands of dirt and carried the body to the warehouse. The only existing evidence is the pollen. The Crime Laboratory can identify pollen as pollen, but it is important to know what kind of plant it came from. This would be a likely case to bring to the Museum. If the pollen had previously been scientifically

described, a botanist could possibly identify the plant and, perhaps, from a knowledge of the area, suggest sites where the plant grows, enabling the police to begin a search for the scene of the crime.

CLUES FROM ANIMALS

Zoologists have helped the Crime Lab by identifying unexplainable marks that have appeared on bodies subjected to exposure. The marks, they discovered, were those made by certain animals that inhabit the Chicago area. Identifying hair and bones as human or other animal, and if not human, what kind, also falls to the zoologist.

Not all of the cases on which the Museum has given assistance have been homicides. Burglaries are prevalent. Fragments of safe insulation or steel filings are sometimes the only clues to follow. These are materials that can be identified with the X-ray diffraction unit. In one case, a factory had been robbed and a suspect was later picked up. In the suspect's station wagon there was discovered an unusual chemical compound which after analysis proved to be identical with the stolen material. The identification linked the auto with the crime.

Scientists can sometimes calculate the length of time that inorganic matter has been in a particular place. For instance, a suspected kidnap-vehicle brought up from a lagoon was examined by Museum scientists. From the vegetation and small animal life which had accumulated on the car while it was submerged, they could tell how long it had been under water. The results indicated that it was there before the crime, thereby ruling out the previous owner as a possible suspect.

The Museum can supply only information which may make evidence meaningful. The Crime Laboratory must piece it together to form a complete account of the crime. A few instances have been mentioned where the Museum served the Police Department in the past. In the future there will, no doubt, be discovered additional ways in which the Museum can co-operate in criminal investigation.

Bacteria-Free Birds

Freedom from bacteria had been reported as one of the unusual features of Antarctic birds. This was investigated by scientists with the 1957–58 Argentine Antarctic Expedition. Penguins examined did have certain types of bacteria (anaerobic), but were free of other common types (aerobic). The absence of these bacteria was found to be correlated with anti-bacterial substances in the shrimps on which the penguins fed, which in turn were found in the tiny floating green plants (phytoplankton) on which the shrimps fed.

Bulletin of American Institute of Biological Sciences, June, 1958.

ANCIENT FORERUNNER OF WHISTLING KETTLE

By DONALD COLLIER
CURATOR OF SOUTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

LIKE many modern devices that are based on old principles, the whistling kettle has an old analogue in the pottery whistling jar of ancient America. Pre-

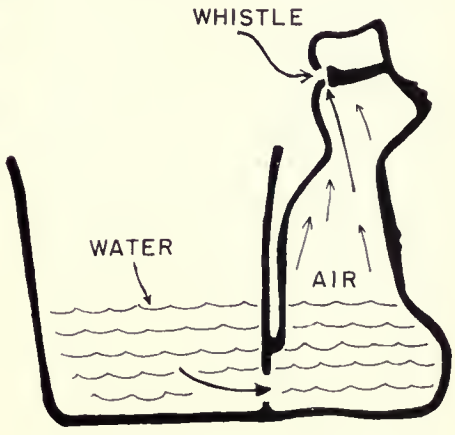
MONKEY-EFFIGY WHISTLING JAR

Columbian whistling pots, which operate by means of a current of air, come from both Peru and Mesoamerica. They are usually composed of two vessels joined near the bottom by a hollow tube. One is open-mouthed or has a vertical spout, and the other is a human or animal effigy closed at the top save for the whistle opening. The whistle is sounded when air is forced through it by pouring water into the open or spouted vessel, or by rocking the half-filled pot so that the water pours into the effigy chamber.

A beautiful and rare whistling vessel from Mexico, shown in the accompanying illustrations, has recently been put on exhibition in Hall 8 (Ancient and Modern Indians of Mexico and Central America). It came from a tomb near Mitla in Oaxaca. It consists of a vase attached to a monkey effigy. The whistle opening is in the back of the monkey's head. It is made of a very fine ware called Thin Orange. The ware, the form of the vase, and the style of the incised and punctuated decoration on the vase make it certain that this vessel was made during the Early Classic period, between A.D. 200 and 600.

Although there are about twenty known whistling pots from Mesoamerica, only four, including the one described here, are of Thin Orange ware. Thin Orange ware is important to archaeologists because it was widely traded. It serves as a horizon marker or "index fossil" of the Early Classic, and gives evidence of the wide extent of commerce during that period. The ware is very common at Teotihuacan, near Mexico City, and at one time this great Classic site was thought to be the place of its manufacture. We now know it was made in southern Puebla, probably at Ixcaquistla. From there it was traded northwestward to Tlaxcala, Teotihuacan and Tula, westward as far as Jalisco and Colima, southward to Monte Alban and Mitla, and southeastward to Uaxactun and Kaminaljuyu in Guatemala and Copan in Honduras.

It is easy to understand why Thin Orange was so popular. Its exceptional thinness, delicacy, lustrous finish, and appearance of fine workmanship are as appealing today as they were fifteen hundred years ago. It is a pleasure to handle a Thin Orange piece. To make a pottery with such delicate walls (1-4 mm. thick) required an exceptionally strong and plastic clay, and it could not be successfully imitated with ordinary clay. But the makers of Thin Orange also had



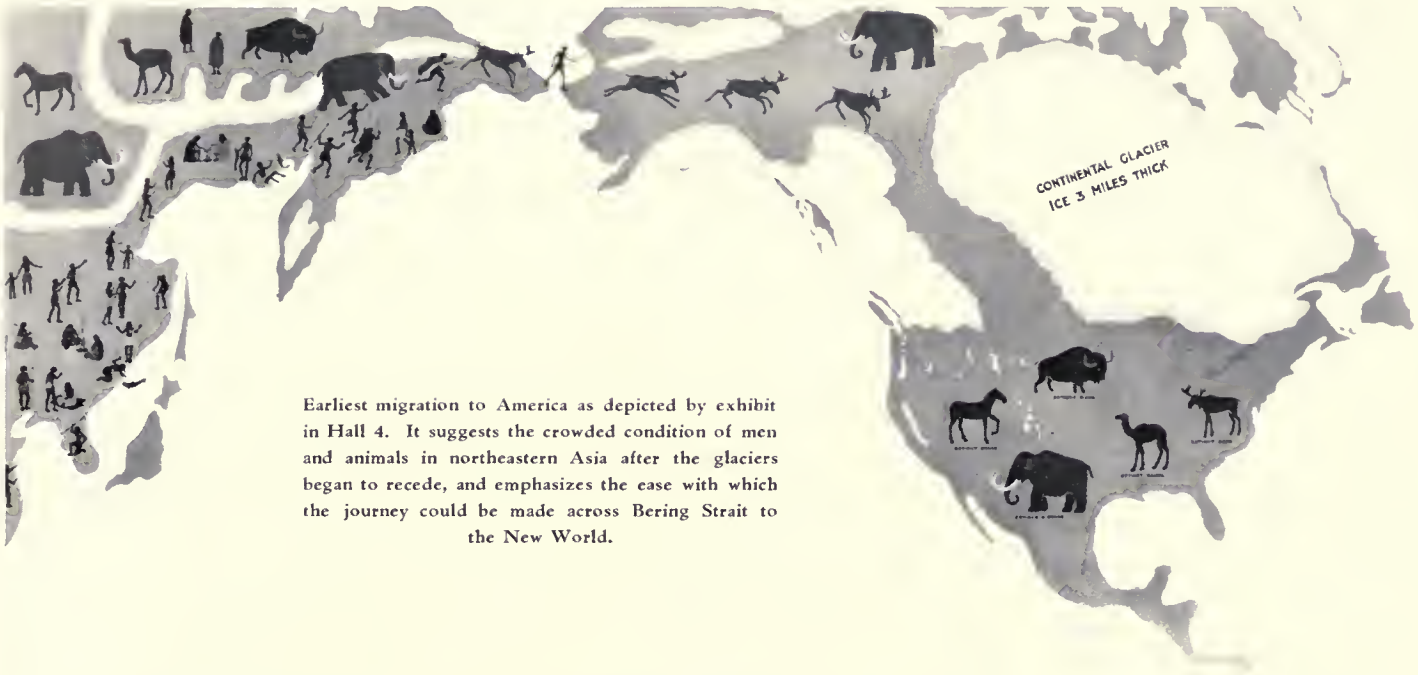
CROSS-SECTION OF WHISTLING JAR

great technical skill in modeling, slipping and controlled firing. Many of the effigy forms, particularly those of dogs and humans, are graceful and beguiling. These potters met the great demand for their elegant product by decorating the vases with mold-made ornaments and duplicating some of the effigy vessels in molds.

Museum Journey for Children

"Life of Ancient Seas" continues as the topic of the Museum Journey for children during April and May. Directions for incoming children are passed out at the north and south entrances. Children who visit the exhibits indicated and fill in answers to questionnaires become Museum Travelers after completing this and three Journeys on other subjects. Eight Journeys qualify them as Museum Adventurers, and twelve as Museum Explorers. The Journeys are an activity of the Raymond Foundation.

The Asiatic sloth-bear mother often carries her baby on her back while searching for insects and worms under stones and logs, as shown in a habitat group in William V. Kelly Hall (Hall 17).



Earliest migration to America as depicted by exhibit in Hall 4. It suggests the crowded condition of men and animals in northeastern Asia after the glaciers began to recede, and emphasizes the ease with which the journey could be made across Bering Strait to the New World.

THE DISCOVERY OF AMERICA*

(*Circa 23,000 B.C.*)

By PAUL S. MARTIN
CHIEF CURATOR OF ANTHROPOLOGY

COLUMBUS usually receives the credit for discovering the New World, but this honor should be given to migrants from northeastern Asia, whom we call the American Indians.

Detailed studies of the physical (racial) aspects of the American Indians show that they are all essentially Mongoloids, although there is some diversity among the various tribes of North, Middle and South America. This may be due to the fact that the American continent was interpenetrated (via Bering Strait) by successive groups of Asiatic migrants. These may have represented a composite of several racial strains, but primarily they were Mongoloid. In other words, some of the divergences of physical types, now observable in the Indians, first appeared in Asia and were then preserved in the New World.

Since no possible ancestral forms of modern man have ever been found in the New World, we may be sure that man did not originate here. Furthermore, since the American Indian may certainly be classed as belonging to the Mongoloid branch that originated in the Old World, we may be confident that he came from Asia. How he came and when and why are fascinating questions about which we have some information and some guesses. We guess that he entered by the easiest and shortest route and that would have been by Bering Strait, for here the distance between the Old and New Worlds is a mere sixty miles at the present time. If man started drifting into the New World about 25,000 years ago, it is safe to assume that he walked from Asia to America on dry land, for the two continents were connected by a land bridge. Even in much later times, when the land connection between the two continents was broken, man could have crossed by boat or on ice, for the strait was narrower and shallower then.

The date of the earliest migrations from Asia to America cannot be exactly stated at present. It is safe to say, however, that man was present in the New World at least 25,000 years ago.

A few migrants to the New World may have reached our shores by boat from the Pacific Islands, but it is usually conceded that such voyages were few in number and probably came about as a matter of chance rather than by intention. Furthermore, if such accidental voyagers lived to tell the tale, they and most of their specialized knowledge, traits, and techniques probably were largely, if not entirely, submerged by the civilization of their hosts.

There are speculations concerning the origin of the American Indians—such fables as Atlantis; the Lost Continent of Mu; the "lost" tribes of Israelites who were merely deported about 725 B.C. to Assyria and who may be described as displaced, enslaved and shuffled about, but *not* lost; and the like; but all of these "hypotheses" may be labeled as fiction based on fancies, opinions, and chance analogies.

The consensus of most anthropologists today is that the Indian is an Asiatic who wandered into the New World and here independently developed an impressive series of cultures that range from a modest set of attainments to higher civilization.

*The article above is from the Prologue to *Digging Into History*, a 158-page book by Dr. Martin, just published by the Museum (Popular Series—Anthropology, No. 38). The rest of the book deals with the findings of fifteen years of work in the Southwest, led by Dr. Martin, to excavate sites of the ancient Mogollon civilization of New Mexico and Arizona. The book, illustrated with many photographs, a map, and drawings by Gustaf Dalstrom, Artist of the Department of Anthropology, is available at the Museum for $1.50—mail orders accepted. It is written especially for laymen and students.

ANIMALS ARE THE 'STARS' IN AUDUBON FILM

The final offering in the current series of screen-tours by the Illinois Audubon Society is "Animals at Home and Afield" to be presented in the James Simpson Theatre of the Museum on Sunday afternoon, April 19, at 2:30. Robert C. Hermes, well-known naturalist-photographer, will be the lecturer. There are many amazing episodes in his color film. One sequence shows the amusing antics of some acrobatic tree frogs. In another, Hermes has caught the moment when a score of baby octopuses in an ocean lagoon first see the light of day. Some ravens put on a clown-like sideshow of their own, while raccoons display their prowess at tightrope walking. Hermes enters into many aspects of the private lives and private worlds of the creatures that share our earth, its air, and its seas.

Admission to the lecture is free, and Members of the Museum and their guests are cordially invited to attend.

Argentinian Scientist Here

Dr. Argentino Bonetto, head of the game and fish department of Argentina, recently visited this Museum to study dry and alcoholically preserved material of South American fresh-water clams.

TWO GRANTS RECEIVED FOR MUSEUM WORK

The National Science Foundation recently awarded substantial grants to Chicago Natural History Museum for the continuation of two research projects. They are the Mecca project under the direction of Dr. Rainer Zangerl, Curator of Fossil Reptiles, and Dr. Eugene S. Richardson, Jr., Curator of Fossil Invertebrates; and the study of animals of Borneo under the direction of Dr. Robert F. Inger, Curator of Amphibians and Reptiles.

The Mecca project, which has been in operation since 1954, involves the detailed study of a thin band of black shale deposited in west-central Indiana some 250,000,000 years ago in the Pennsylvanian period. During the last four years the primary concerns have been the collection of specimens from the site and the charting of the fossil remains for future study. The field work is now complete, but the greater task of studying, collating, and evaluating the evidence is yet to come.

The grant from the National Science Foundation will enable Richardson and Zangerl, the principal investigators, to continue the paleoecological study of the area at an accelerated pace. Within three years they hope to be able to reconstruct the environmental conditions that existed during the time of deposition of the shale almost exactly as if it were happening today and we were able to witness the process.

Inger, since 1950, has been studying the reptiles and amphibians of Borneo, how they got there, their distribution, and their effect upon one another within the complex environment of the rain forest. Part of the grant will make it possible for Inger to study type specimens of animals housed in museums in Europe and other parts of the world.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology

From: Mrs. John Foster Gilchrist, Chicago—Aztec pottery figurine, Mexico; E. T. Wiltsee, Centerburg, Ohio—Jicarilla Apache Indian water basket, Chama, New Mexico.

Department of Botany

From: Academy of Natural Sciences, Philadelphia—21 phanerogams, South America; Prof. P. Maheshwari, Delhi, India—flowering specimens of *Lemna* and *Wolffia*.

Department of Geology

From: Mrs. Ethel Doerrer, Tinley Park, Ill.—4 trilobites and a fossil shrimp; Willard P. Leutze, Richmond, Ind.—a fossil Eurypterid, Syracuse, N. Y.

Department of Zoology

From: Dr. N. L. H. Krauss, Honolulu—47 amphibians and reptiles, an eel, Panama, Washington State, India, Ceylon, Indo-China and Philippines; Colin C. Sanborn, Marcella, Ark.—a fox; Dr. Jeanne S. Schwengel, Scarsdale, N. Y.—marine shells and cowry shells, worldwide; Frank E. Simmons, Oglesby, Tex.—16 inland mollusks; Dr. Victor G. Springer, St. Petersburg, Fla.—99 fishes; Dr. Fritz Zumpt, Johannesburg, South Africa—a frog, 4 snakes, parasites, sucking and biting lice, South Africa.

NEW MEMBERS ADDED TO MUSEUM ROLLS

(February 18 to March 16)

Life Member

Dr. J. Roscoe Miller

Associate Members

Harold W. Alenduff, Rosecrans Baldwin, Jay Berwanger, James P. Dillie, Mitchell Edelson, Jr., W. H. Garvey, Jr., S. Ashley Guthrie, Joseph Halouska, J. H. Herz, Howell H. Howard, Frank D. Huth, Arthur K. Kribben, Delafield Kribben, Herbert F. Lello, David N. McCarl, Frank B. Papierniak, Henry Perlman, Holman D. Pettibone, John J. Poister, George A. Reilly, Budd Sills, Lendol D. Snow, George Tonn, Eugene C. Travis, William M. Trumbull, Dr. Edward F. Webb, Arthur Wlochall.

Sustaining Members

Richard McClung, Mrs. Lenora C. Westerhold

Annual Members

Mrs. Wolcott S. Allison, Norman Andreasen, Mrs. Luther B. Andrews, Mrs. Otis G. Andrews, Henry X Arenberg, Mrs. Alex J. Arieff, John A. Arnold, Mrs. W. Russell Arrington, Mrs. Frederick T. Aschman, Mrs. Milton S. Axelrad, Joseph Wm. Bagnuolo, William F. Benoist, Jr., Irving Birnbaum, Thomas J. Boodell, Joseph Borenstein, Arlie O. Boswell, Jr., Floyd E. Britton, Bernard B. Brody, Ben C. Brostoff, Edward I. Brown, Aloys L. Bruckner, Joseph E. Brunswick, Paul W. Brust, Russell Bundesen, Jewell V. Burk, Arnold L. Burke, Lee M. Burkey, Jr., Thomas D. Burlage, Merwin R. Burman, Robert S. Burrows, David T. Busch, R. Cadmore, John R. Caffrey, Joseph B. Caracci, Robert P. Carey, Sherman Carmell, Robert Cavanaugh, George R. Cermak, George J. Cervenka, William F. Coale, Jr., John T. Coburn, David L. Coghlan, Jack A. Cohon, Jack Z. Cole, Miss Natalie Crohn, Lawrence J. Dahlgren, Jules Dashow, David Davidson, John W. Dawson, Theodore C. Diller, Harry A. Dow, Jr., George Echt, Samuel Edes, Nathan N. Eglit, Richard L. Ekstrand, Maurice R. Ely, Paul W. Goodrich, George E. Hachtman, Mrs. Melvin J. Hagen, Mrs. Burton W. Hales, Edward W. Hallauer, Miss Alice Howe, Mrs. Florence H. Hunter, Miss Margaret L. Moran, Walter M. Norton, Miss Mary E. Sage, Eugene B. Schultz, Jr., Robert Tremper.

The systematic collection of fishes in Hall O includes primitive fishes, sharks, rays, and a series of bony fishes that range from herrings and salmon-like fishes to spiny-rayed fishes and such odd forms as trigger fishes and angler fishes.

FOUR TRAVEL LECTURES OFFERED IN APRIL

Four more lectures in the spring series for adults remain to be given on Saturday afternoons in April. Illustrated with color motion pictures, the lectures will be given at 2:30 P.M. each Saturday in the James Simpson Theatre of the Museum. They are provided by the Edward E. Ayer Lecture Foundation. Admission is free. Museum Members and their guests are admitted to a reserved section of the theatre upon presentation of membership cards. Following are dates, subjects and lectures:

April 4—France
Kenneth Richter

April 11—Sicily, Island of the Sun
Robert Davis

April 18—The Faraway Falklands
Olin Sewall Pettingill, Jr.

April 25—Ranch of the Purple Flowers
Robert C. Hermes

STAFF NOTES

Dr. Sharat K. Roy, Chief Curator of Geology, gave a film-lecture on volcanoes of Mexico and Central America for a recent meeting of the Chicago Lapidary society . . . **Dr. Eugene S. Richardson, Jr.**, Curator of Fossil Invertebrates, spoke before the Northern Biology Teachers' Association at Oregon, Illinois, on the Museum's Mecca (Indiana) paleontological project. . . . **Rupert L. Wenzel**, Curator of Insects, recently made studies of collections in museums of Washington, New York and Cambridge, Massachusetts. . . . **Dr. Roland W. Force**, Curator of Oceanic Archaeology and Ethnology, has been appointed Associate Editor of a new worldwide anthropological journal, *Current Anthropology*. Recently he attended a Philadelphia meeting of a National Science Planning Board group working out plans for the "Man and Culture" portion of the Century 21 Exposition to be held in Seattle in 1961. He also gave a lecture on the Palau Islands before a Chesterton (Indiana) audience. . . . **Bertram G. Woodland**, Associate Curator of Petrology, recently lectured before the Kennicott Club on trends of thought in geology.

PLEASE NOTIFY MUSEUM IF YOU'RE MOVING

Members of the Museum who change residence are urged to notify the Museum so that the BULLETIN and other communications may reach them promptly. A card for this purpose is enclosed with this issue.

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CHICAGO NATURAL HISTORY MUSEUM
Bulletin
Vol. 30 No. 5
May 1959

MUSEUM MEMBERS' NIGHT
Friday, May 8, 7 to 10:30 p.m.
'PANORAMA OF THE PACIFIC'

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WABASH 2-9410

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Members are requested to inform the Museum promptly of changes of address.

SOUTHWEST EXPLORERS RETURN TO 'DIG'

IN MAY the 1959 Southwest Archaeological Expedition of the Museum will begin its fourth season of operations in an area south of the Petrified Forest in Arizona.

Among the objectives of the expedition will be the finding of more clues indicating the ancestral background of the American Indian and of the Western Pueblo Indians in particular. Even more specifically the archaeologists hope to uncover additional evidence which will link up the history of the present-day Zuni Indians with that of prehistoric tribes who lived around the headwaters of the Little Colorado River.

Dr. Paul S. Martin, Chief Curator of Anthropology, is the leader of the expedition, and Dr. John B. Rinaldo, Assistant Curator of Archaeology, is his principal associate. Other members of the Museum staff who will take part in the work are Allen Liss and Howard Anderson of the departmental staff. Several college students and local residents have also been engaged to help with the research and digging operations. This will be the Museum's sixteenth season of exploring the Mogollon culture and the twenty-fifth of the expeditions to the Southwest.

The destination of these archaeologists, out to search for traces of the early Indians, is Vernon, a small town located in rugged mountainous country about 120 miles northeast of Phoenix. In this area among the yucca, cedars, cacti and tumbled-down ruins they hope to uncover tools, weapons, pottery vessels, ceremonial objects, dwellings or other artifacts which have a generic resemblance to those of the modern Zuni or Hopi Indians.

By a classification of these artifacts and a comparison of the different styles produced with those from other prehistoric and historic villages previously explored, they will gradually piece together a picture of a way of life directly ancestral to one of the Western Pueblo Indian tribes.

PREVIOUS FINDINGS SUMMARIZED

What have they been able to fit together from the shattered fragments recovered so far?

Because they have been reconstructing a series of life-ways extending through several time-intervals back 3,000 years or more, this picture might be likened more readily to a motion picture, consisting of a sequence of frames starting with the earliest remains of this culture. This early period—the first frame in the picture—is called the Concho Complex. At this time the Indians were nomadic hunters and gatherers, dwelling along the shores of extinct lakes. The evidence for this mode of existence consists of small piles of burned rock and charcoal which mark their ancient fires, grinding slabs, hand-sized stones for use in milling, bone fragments of the animals they hunted, spear points, knives and scrapers. These and other remains show they probably built light brush or skin shelters near their hearths and that they gathered seeds, nuts, berries and roots, and hunted deer, rabbits and other small game for food. It is assumed that they wove sandals and baskets and that they cooked in these baskets by stone-boiling with the rocks found in their former hearths. This culture has been dated by radioactive carbon at about 1500 B.C. and it probably lasted until the time of Christ or later.

The next frame in our movie shows a later group of the same Indians who made pottery, practiced agriculture, and lived in pit-houses—deep excavations with hard clay or gravel walls plastered with adobe, and roofed over with a heavy post, timber and earth structure. Whether this "pit-house" period immediately succeeded one much like the Concho period, or if there was a transitional phase similar to that found in the previously explored Pine Lawn Valley of New Mexico, will be determined by further systematic search this summer and possibly by future excavation.

Succeeding the pit-house period was one in which the people split up into smaller groups consisting of fewer families, and began to build houses with stone masonry walls, either partly or entirely above ground. Several additional styles of painted pottery and textured decorated pottery were made.

As time went on, population increased and the later villages were much larger and frequently had large ceremonial structures nearby. The majority of the pottery is more elaborately decorated and there is evidence of considerable specialization in tool types.

LINKS WITH THE ZUNI

Now, what has been found to link this culture specifically with that of the Zuni Indians? Probably the most definitive clue is continuing and overlapping styles of pottery decoration which have their latest representation in historic Zuni pottery designs, as distinguished from those of other Pueblo Indian groups. Further close resemblances have been noted in architecture—in the character of the late prehistoric ceremonial rooms, and in the manner of growth of villages as a cluster of rooms rather than as rows of rooms along a street or plaza.

At the present stage of these investigations we find it possible to reconstruct many of the crafts practiced by these Indians, to learn how they made their tools, weapons and pottery, and to visualize much of what their subsistence economy was and something about their community organization. However, we still find it difficult to visualize their religious institutions or spiritual life except in the most general terms. We hope that a tie-up with one of the historic groups —probably the Zuni—will give us added insight into these aspects.

Several sites will be excavated in 1959. Probably additional ceremonial structures as well as one large later site will be dug into. We also hope to discover a dry cave which contains well preserved wooden and textile objects to fill out gaps in our knowledge of these crafts and to increase our knowledge of the social habits of these people.

THIS MONTH'S COVER

A temple image from Hawaii—one of only two similar idols known to remain in existence—is shown on our cover. Prior to its acquisition by Captain and Mrs. A.W.F. Fuller, of London, this specimen was included in an 18th century private collection. It was believed by the family who owned it that an ancestor who had sailed with Captain Cook on his third voyage had brought it to England. Images such as this are known to have stood in open-air platform temples ("heiaus") and to have been carved by tribal artists at the order of powerful chiefs. The pictured specimen is among the objects selected from the Fuller collection, now the property of the Museum, for the special exhibit to be staged on Members' Night, Friday, May 8.

PANORAMA OF THE PACIFIC FOR MEMBERS' NIGHT, MAY 8

THE romantic South Sea islands, so often described in song and story, are the origin of the main attraction of this year's Members' Night at the Museum. Visitors entering Stanley Field Hall **Friday evening, May 8,** will be greeted by "Panorama of the Pacific," a display of artifacts from the collection of Captain and Mrs. A. W. Fuller.

In the past year, the Museum has progressed in its exhibition program, and also in the research which adds to the sum total of man's knowledge. Museum Members have contributed to this growth and progress, and they are invited with their friends to view the new exhibits in all departments, and visit with the staff in the offices and workshops "behind the scenes."

Open House

For those who wish to come early and dine at the Museum, the Cafeteria will be open from 6 to 8 P.M.

Traditional "open house" will be held from 7 to 10:30, during which time the scientists, artists, preparators and technicians will meet with Members in their working quarters on the third, fourth and ground floors. In these offices, laboratories, studios, and shops, usually inaccessible to the public, the staff will discuss their unique work and explain the intricate processes involved in creating Museum exhibits, some of which will be seen for the first time on Members' Night.

Tours of the third and fourth floors will be conducted by the Raymond Foundation staff. However, those wishing to wander independently through the offices and laboratories are welcome to do so. The vast study collections, which far outnumber the specimens in exhibition halls, will also be available for inspection.

During open house hours, visitors are urged to see the exhibits which have been added since the last Members' Night.

New Exhibits

"Panorama of the Pacific" (Stanley Field Hall) does not represent the "islands" as they are extolled in song and story today, but it does represent a past culture which existed in Australia, Polynesia and Melanesia. "Panorama" includes objects, both utilitarian and ceremonial, of wood, shell, stone, bone, fiber, and coral. The techniques used in making these remarkable carved and decorated artifacts without the aid of metal tools have been lost with the passage of time, and it is only in museums and private collections that these vestiges of past cultures may be seen. The Fuller collection, assembled during some 60 years, was acquired by the Museum from its London owners last year.

Another important feature on this year's roster of exhibits is the newly reopened Charles F. Millspaugh Hall of North American Trees (Hall 26). The major part of the hall has been completely reinstalled, remodeled and relabeled to explain the natural history of North American trees, particularly those of the United States. New cases have been added representing principal forest areas and indicating distribution, past and present; "Forests of the Past," now petrified; stratification in a forest, and "How a Tree Works."

Clarence Buckingham Hall of Meteorites, Moon, and Minerals (Hall 35) has been remodeled to present today's ideas on the physical-chemical composition, formation, and classification of minerals. This hall has one of the largest collections of meteorites—the only tangible visitors from outer space which have yet descended to this planet.

New additions have been added to the Hall of Ancient and Modern Indians of Mexico and Central America (Hall 8) representing cultures of the Gulf Coast, Western Mexico, Oaxaca, Zapotec, Mixtec, Guerro, and Teotichuacan.

"What Is Primitive Art?," a recent anthropological exhibit providing the answer to that question, is located in Hall H on the ground floor.

Drawings and paintings by adult and junior students of the School of the Art Institute will be found in Albert W. Harris Hall (Hall 18) and the north corridor of the ground floor. The art work was inspired by exhibits seen by the students at the Museum during classes.

Printed guides will direct Members to additional new exhibits in the halls of anthropology, botany, geology and zoology.

The evening will close with light refreshments served in Stanley Field Hall and the Library. President Stanley Field, Director Clifford C. Gregg and other Museum officials will greet Members in Stanley Field Hall.

Transportation and Parking

Free parking is available at the north entrance of the Museum for those who drive. For those who do not drive, a special shuttle bus with signs indicating that it is destined for the Museum will leave Jackson Boulevard and State Street at 15-minute intervals beginning at 6:30 P.M. City-bound service will continue until 10:45 P.M. Stops will be made both ways at Seventh Street and Michigan, and at Jackson and Michigan.

SCHOOLS' SCIENCE FAIR AT MUSEUM MAY 16

The world of the future as visualized by America's youngest generation of scientifically-inclined minds will be on exhibition for one day all over the vast area of Stanley Field Hall of the Museum on Saturday, May 16. That is when this year's Chicago Area Science Fair will be staged by youngsters ranging from elementary sixth-graders to high school seniors. At these fairs here in past years there have been astonishing creations in the way of elaborate demonstrations and fantastic models of everything from nuclear engines and robots to the life-cycle of a cicada or the human circulatory system. In addition, the children who have designed these exhibits are prepared to give very sophisticated and accurate expository lectures on their subjects for groups of visitors to each individual display.

The show will be on from 9 A.M. to 5 P.M. The participants include pupils of public, private and parochial schools of Chicago and within a 35-mile radius of the city. In this respect it differs from the Chicago Public Schools Student Science Fair, held in April, which was limited to public schools within the city limits. Prizes and other awards will be made at the close of the day to each grade-level from 6 through 9. Awards on a subject-area basis will be made in the grades from 10 through 12. The event is sponsored by the Chicago Teachers Science Association. A number of working scientists and engineers from the professions and industry are expected to attend for the purpose of consulting with promising students to aid them in their further development toward careers.

STAFF NOTES

Dr. Alan Solem, Curator of Lower Invertebrates, and **Henry S. Dybas,** Associate Curator of Insects, have returned from a three-month zoological expedition in Panama. . . . **George I. Quimby,** Curator of North American Archaeology and Ethnology, recently made studies at museums in East Lansing and Grand Rapids, Michigan, in connection with his research project into the archaeology of the Great Lakes region. He also studied private collections. . . . **Dr. Theodor Just,** Chief Curator of Botany, and **Dr. Roland W. Force,** Curator of Oceanic Archaeology and Ethnology, were interviewed about their fields of science on Radio Station WAAF in April. **Emmet R. Blake,** Curator of Birds, and **Eugene S. Richardson, Jr.,** Curator of Fossil Invertebrates, will be heard in the same series at 5:30 P.M. on May 3 and May 10 respectively. Mr. Blake lectured on the work of his recent expedition to Peru before the Kennicott Club, Chicago, and the Evanston Bird Club. . . . **Rupert L. Wenzel,** Curator of Insects, attended the recent Conference of the North Central States Branch of the Entomological Society of America at Columbus, Ohio.

Captain Fuller and Curator Force during documentation and packing in London.

S.S. Rutenfjell with the Fuller Collection on board.

One of four huge cases containing specimens as it was stowed in ship's hold for voyage.

Four tons of Pacific Island at Chicago's

THE PA

Museum Member of archaeological and the first public exhibi ago (BULLETIN, Sept part of the Museum' collection itself, but t Curator of Oceanic Ar of the collectors and a journey from London

Museum personnel dismantling a large shipping case.

Specially built boxes containing long specimens required a number of men because of their weight.

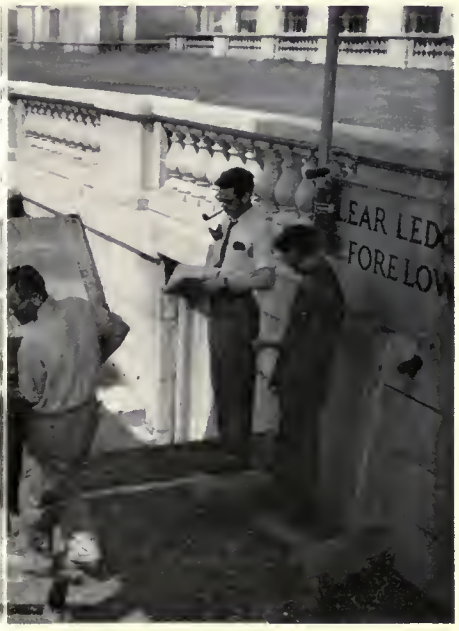
Individual boxes were checked a for their last

terials being hoisted ashore
umet Harbor.

Safe arrival at the Museum.

IFIC'S BEST COMES TO CHICAGO

ll have the opportunity of viewing selected specimens from the famed Fuller Collection nological materials from the South Seas on Members' Night, May 8, 1959. This will be of this collection since it was begun by Captain A. W. F. Fuller of London over 60 years ber, 1958). This remarkable assemblage of objects from the Pacific world now forms a acific Research Laboratory. The Museum is fortunate to have acquired not only the wealth of documentation supplied by Captain and Mrs. Fuller. Dr. Roland W. Force, eology and Ethnology, spent six months of 1958 in London where he recorded the remarks ged for packing and shipment. On these pages an abbreviated version of the collection's the Museum is depicted.



y were loaded onto the freight elevator
n their long journey.

Dance Mask from the
Torres Straits.

Safely ensconced in the Museum's Pacific Research Laboratory, several rare items are examined by President Field as members of the press note details.

THE VARIED PEOPLES OF THOUSANDS OF PACIFIC ISLES

By ROLAND W. FORCE
CURATOR OF OCEANIC ARCHAEOLOGY AND ETHNOLOGY

THE YEAR 1959 will be remembered for the admittance of seven small islands, situated 2,000 miles west of the coast of California, as our 50th state. The Hawaiian Islands of today are vastly changed from what they were when Captain James Cook, the great English explorer, landed there about 180 years ago. Honolulu is a modern 20th century city with thriving industries, beautiful homes, wide boulevards, schools, museums, and all the trappings of a contemporary metropolis. In the years following their discovery by Captain Cook, the Hawaiian Islands became the crossroads of the Pacific even though they were among the last islands to be discovered by Europeans.

The so-called age of discovery in the Pacific began with Magellan's ill-fated initial crossing of the ocean in 1520 and culminated with Cook's three voyages (1768–79). The most restricted view of the Pacific was probably that of Balboa. Seven years before Magellan's voyage, Balboa stood on a peak in Panama and looked out over what he termed the South Seas. The most panoramic view of the Pacific was probably Cook's. On his voyages he and his men touched the Society Islands, New Zealand, the Hervey Islands, eastern Australia, the Tuamotus, the Marquesas, Niue, New Caledonia, Norfolk Island, Tubuai, many other smaller islands, and, of course, Hawaii. He used the newly developed chronometer and sextant to chart the Pacific so expertly that little revision in the maps he made has been necessary. Plants were collected, natives sketched and described, notes were taken on natural resources, harbors were listed, currents were noted, and, in general, exhaustive information of all descriptions was collected.

Of especial importance to anthropology is the fact that Cook also collected ethnographic specimens on many of the islands he visited. All in all, this man and his sailing companions solved most of the major mysteries of the Pacific and, as one author has put it, left little for voyagers who followed him to do but admire. Some who followed in his footsteps found much to do, however. The traders, missionaries, whalers and others who ventured into the newly discovered island world, either inadvertently or deliberately, caused the Pacific cultures to change. Disease and warfare as well as blackbirding took their toll of islanders' lives. Those who survived these plagues were influenced by the teachings offered and the examples set by the newcomers. The wheels of cultural change were set in motion and the process of sweeping cultural alteration, which is still in progress, was initiated —the Pacific of old was destined to be lost.

Of all the points worth stressing about the Pacific, there are two which stand out. One is *size*. The Pacific is a vast region composing approximately one-third of the earth's surface. The second point worthy of stress is that of *contrast* and *variation*, brought about in part by vastness and isolation. This great area of the world stretches from Southeast Asia to the west coasts of North and South America. Ten thousand islands lie scattered over the face of what we also call Oceania. They vary from tiny atoll islets barely visible above the pounding surf to continental Australia, three million miles large. Contrast and variation in the Pacific are greater than most suspect. There are deserts in Australia, muggy, insect-ridden equatorial mangrove swamps in coastal Melanesia, and snow-capped "alps" towering 12,000 feet in New Guinea. There is contrast and variation in climate, island size, elevation, soil, resources, fauna, flora, and in people.

Principal feature for Members' Night (Friday, May 8) will be a special exhibit of objects from the recently acquired Fuller Collection of Pacific Islands Material Culture. In the accompanying article, Dr. Force summarizes the historical and ethnological background of the South Sea islands that the Fuller collection documents.

MAGMA AND MIGRATIONS

The Pacific and the people who live and have lived there can be understood only when viewed against a backdrop of geography and geology. Great tectonic shifts in the corpus of the earth occurred about a hundred million years ago in the western Pacific. Intense folding and faulting thrust up great ridges which rose from the floor of the Pacific mostly in an east-west direction. Mountains were raised above the surface of the water, basaltic magma erupted, and volcanoes formed even higher peaks. Later the great ridges submerged thousands of feet and left only the peaks of the great sub-aquatic cordilleras exposed.

Another kind of eruption took place in this part of the world about the end of the Ice Age, or roughly some 25,000 years ago. It was a gradual eruption and was composed of people. Perhaps trickle is a better adjective than eruption if we view the events of history in Pacific settlement in proper perspective. Small bands of relatively primitive people with few possessions and even fewer ideas of where they were going began to trickle out of Southeast Asia. They moved relatively short distances—they had only flimsy water craft and many were lost. Perhaps in a score of generations only a few islands might be traversed, but constant population pressures, inter-tribal wars and accidents of weather and navigation resulted in a steady, if slow, eastward migration into the Pacific. Later some peoples became skilled boat builders and intrepid sailors. Techniques of food and water storage and star navigation were improved and learning from experience—some of it disastrous—enabled these dauntless mariners to penetrate into virtually all parts of Oceania. The Pacific at last had people.

With their bare feet they scuffed through beach rubble, trod on red volcanic soil or bleached coral sand to gain a toehold. They built simple thatched houses, fished the lagoons, and farmed marshy plots, sometimes fertile, sometimes awesomely sterile.

With them, these voyagers brought their customs, their ways of life, their values, their beliefs in God and nature, their languages and, of course, they also brought their skin colors, their hair and nose forms, their stature and all of the other physical characteristics with which their ancestors had provided them.

They traded their ways of life and customs as well as their racial characteristics with other people they met and then became isolated and developed in ways peculiar to themselves. For example: many Pacific peoples ornamented their persons by tattooing, but patterns, techniques, and special features became highly stylized and representative of only one area. The Maori of New Zealand concentrated on facial tattooing and curvilinear designs. The Marquesans, on the other hand, tattooed the entire body—even to the eyelids and soles of the feet—in designs strikingly different from their Polynesian neighbors in faraway New Zealand.

WHO AND WHERE

In each little island enclave, people built a distinctive culture which shared a common core with many others but was still remarkably different from that of any other group. Isolation for long periods of time tended to promote cultural, linguistic and racial differences. However, the Pacific may be broken up into several larger enclaves in which there are basic similarities.

Polynesia (which means many islands) is a great triangle in the east. It has at its apexes Easter Island on the east, Hawaii on the north, and New Zealand on the south. Micronesia (small islands) forms a belt across the northern Pacific from the Marshalls to Palau in the west. It is bordered on the south by the equator.

South of this median line on our globe in-

(*Continued on page 8, column 1*)

MUSEUM MEMBERS' NIGHT
Friday, May 8

NATURE-ART STUDENTS DISPLAY CREATIONS

The lively imagination of the young child, and the more advanced artistic skill of the adult combine to produce a colorful and refreshing show of art work by students of the School of the Art Institute in a special exhibit at Chicago Natural History Museum.

The special exhibit, which will continue from May 1 through May 31, includes nearly 100 paintings and drawings in many mediums by junior school students (first through twelfth grades) and adult day students based on exhibits in this Museum. The exhibits provide the students with new forms and subject matter to observe and paint. The wide range of the students' ages affords an interesting representation of the progressive stages in the development of an artist.

Forty paintings by students in the junior school, under the direction of Edithe Jane Cassady, will be displayed in the north corridor of the ground floor. Delightful interpretations of Museum exhibits, particularly of the animal habitat groups, are exhibited in the children's works. Not yet restricted by the confines of reality, they have injected life and action into their subject matter—even to the extent in one painting of animating a skeleton and placing it amidst a field of flowers.

Art work by first-year adult students in basic drawing classes, instructed by Richard Keane and Ethel Spears, and the second-year adult classes, conducted by Tom Kapsalis, will be located in Albert W. Harris Hall (Hall 18). These drawings and paintings are representative of the adults' approach to subject matter which they cannot come into contact with inside the classroom. Naturalistic studies of animals and birds, and abstract works based on realistic forms predominate in the exhibit. Multiple image drawings of the same figure from different angles, emphasizing linear relationships, comprise a smaller portion of the works.

IT'S ALL ONE TRANSPARENT EAGLE

A multiple-image drawing showing the bird from different points of view, stressing linear relationships. Included in this month's special exhibit at this Museum from the School of the Art Institute, it is the work of Richard Chen, a first-year student in the adult basic painting and drawing class.

Selecting the paintings and drawings to be exhibited this year were Marion Pahl, Staff Illustrator, and Phillip Lewis, Assistant Curator of Primitive Art, at the Museum.

The instructors in the junior school whose students are represented are Mrs. Berta Caul, Joseph S. Young, Mrs. Donald Novotny, Mrs. Martha Larson, Barbara Aubin, Herb Forman, Eugene Szuba, Diane Von Eitzen, Alvin Nickel, Adelheid Hirsch and Constance Racht.

MUSEUM MEMBERS' NIGHT
Friday, May 8

NEW MEMBERS

(March 17 to April 15)

Non-Resident Life Member

Mrs. Vera Lash Smith

Associate Members

Dr. Irving Blumenthal, Dr. Milton Braun, A. C. Buehler, Jr., Mrs. Robert F. Carr, Robert Diller, W. J. Foell, Lester E. Frankenstein, George D. Hardin, William P. Hypes, Floyd E. Jessen, William J. Keene, Dr. M. J. Kostrzewski, Frank B. Kozlik, L. S. Larson, John A. Leith, Robert J. Ley, Mrs. Mason A. Loundy, Mrs. John A. MacLean, Jr., Arnold D. K. Mason, Raven I. McDavid, Jr., Oscar L. Moore, Wilbur C. Munnecke, Carroll Dean Murphy, Jr., Mrs. Fentress Ott, Robert E. Pflaumer, Robert C. Preble, Mrs. John A. Prosser, Douglas K. Ridley, Mrs. George P. Rogers, Miss Marion H. Schenk, Mrs. Vaughn C. Spalding, Jr., Allen P. Stults, Roy E. Sturtevant, Carroll H. Sudler, Jr., Leon F. Urbain, M. P. Venema, Mrs. Maurice Weigle, Dr. Emanuel C. Wilhelm, Howard L. Willett, Jr.

Sustaining Members

Arthur Joel Bell, R. J. Hepburn, Francis M. Rich

Annual Members

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HALL OF TREES REOPENS WITH NEW EXHIBITS

AS THEY STROLL through the newly remodeled Charles F. Millspaugh Hall of North American Trees (Hall 26), visitors can choose their summer vacation spot in a woodland region, pick out the proper wood for furniture, and learn the natural history of North American trees. The Hall of North American Trees is to be reopened on Members' Night, Friday, May 8.

Designed to present the natural history of North American trees, particularly those of the United States, the hall contains cases exhibiting 84 species of hardwood and softwood trees. A large fossil tree stump 250,000,000 years old, found in a Pennsylvania coal mine, rests in the center of the hall. On the walls surrounding it are four entirely new exhibits.

The standing cases, each devoted to a single tree species, contain a section of the trunk with bark, a branch, large pieces of lumber showing the wood structure, a distribution map, and summer and winter photographs. In addition, explanatory labels stress interesting aspects of the natural history of the tree, and list important fungus diseases, insect pests, and characteristics and uses of the wood.

One of the new exhibits illustrates the principal forest areas of the United States; smaller maps show the change in original forest coverage from the time of the arrival of the white man to the present, and the fact that one-third of the land area of the United States is still covered with woodland. Of unusual interest are the colorful and highly polished large sections of petrified wood which document eloquently "Forests of the Past" in another new exhibit.

Details of the major structural elements and principal functions of a tree, and the mystery of plant reproduction are illustrated and explained by "How a Tree Works." The fourth new exhibit shows the complex aggregation of tree and other plant species in an Illinois forest and also how the composition of forests varies at increasing elevations on a mountain side.

A new arrangement of cases and the beautifully painted transparencies give a feeling of outdoor spaciousness in the Museum's indoor "forest."

PEOPLES OF THE PACIFIC—

(*Continued from page 6*)

cluding most of New Guinea and myriad islands to the east and northeast, lies Melanesia (the black islands). Still farther south is Australia.

Farther west is Malaysia or, as it is sometimes called, Indonesia. Here are the islands which cluster about the feet of Asia—islands which have felt the impact of countless waves of Asiatic peoples who have surged out of the great continent in search of new homes. Influences have been received from the high cultures of Asia—from India and even from the Near East.

Melanesians are darker-skinned people with bushy or frizzly hair, somewhat larger than Malaysians and with distinctive nose and head forms. Variation is extremely great between island groups however, and the heterogeneity is present even between lowland or coastal peoples and their highland neighbors in diverse New Guinea.

Polynesians are relatively tall, well-muscled, straight- or wavy-haired and light-skinned. The racial affinities with the major Caucasoid or white stock are apparent. Malaysians generally show racial affinities with the peoples of Asia.

As we might expect because of their geographic position between the Polynesians and the Malaysians, Micronesians range between the two in their physical characteristics. The Australian aborigines are an additional variant in physical type and represent the earliest migrants into the Pacific.

Variation within each of the major areas is extremely great and it is not at all uncommon to discover an individual in one area who, if he were in another, would pass as any "native on the street." Variation in culture and language is also exceedingly great. Ways of thinking with respect to family organization in one island may relate to the mother's line—in another, the father's. Some people eat dogs; others eschew this tasty dietary supplement. For one island there is a supreme deity—on another a pantheon of nature deities—on still another there are both.

Linguistically, the peoples of the Pacific appear to substantiate the Biblical story of the Tower of Babel. Many languages of the world may be traced to a common antecedent stock. So it is with numerous Pacific languages which may be traced to Malayo-Polynesian or Austronesian—a root or mainstem language family such as Indo-European. We have much yet to learn about the languages of the Pacific and this fact holds as well for other features of Pacific culture.

REMNANTS AND RESEARCH

The fact remains that while we understand a good bit about Pacific peoples, there is still much to know and as time goes by and contact between the Pacific and the rest of the world increases in frequency and intensity, there is less and less opportunity for understanding this remarkably variable and vast region. Just as the Hawaii of today is vastly changed from what it was in Captain Cook's day, so are other island cultures changing.

It is with this realization in mind that the true worth of the Fuller Collection of archaeological and ethnological materials from the South Seas can be appreciated. More than 60 years of discriminating collecting of objects brought back from the Pacific by early explorers, missionaries, and government officials has resulted in one of the most important collections of Oceanic materials ever made. Captain and Mrs. A. W. F. Fuller of London have devoted their lives to the task of preserving the physical remnants of island cultures now either extinct or very different from their aboriginal state. The collection, brought here from England last fall, consists of materials from Australia and Tasmania, Melanesia, and Polynesia and provides numerous opportunities for scholarly research and exhibition. In and of itself, the Fuller Collection stands as a testimonial to the great breadth, the variation, and the contrast of an island world which is fast becoming submerged by Western World culture. In short, it provides a panorama of the Pacific of yesteryear.

MUSEUM MEMBERS' NIGHT
Friday, May 8

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Zoology

From: Dr. Reznear M. Darnell, Milwaukee—41 lots of invertebrates, Lake Pontchartrain, La.; Richard Graybeal, Great Lakes, Ill.—25 lots of non-marine shells, Idaho and California; Philip Hershkovitz, Riverdale, Ill.—180 reprints of scientific articles; Harry Hoogstraal, Cairo, Egypt — 35 bird skins; Leslie Hubricht, Catonsville, Md. —collection of land shells, Sharon, N. Y.; Dr. Paul D. Hurd, Jr., Berkeley, Calif.— 11 Xylocopid bees, U. S., Central America and South America; Dr. Karel F. Liem, Urbana, Ill.—46 frogs, Java; Dr. Reinaldo Pfaff, Colombia—collection of shells; Ray Summers, Petaluna, Calif.—two species of cowrie shells, Easter Island and Philippines; John A. Wagner, Riverside, Ill.—454 butterflies and moths, U. S. and Mexico; Dr. H. B. Sherman, Gainesville, Fla.—bat parasites; Dr. Alan Solem, Oak Park, Ill.—12,000 shells; Tarpon Zoo, Tarpon Springs, Fla.— 2 snakes, Colombia; Lt. Col. Robert Traub, Kuala Lumpur, Malaya—310 batflies, Malaya, Madagascar, India; Tom Whisnant, New Orleans—a turtle, Libya; William Abler, Chicago—a butterfly; Animal Welfare League, Chicago—a snake; Bernard Benesh, Burrville, Tenn.—321 insects; University of California, Los Angeles—48 lots of fishes; Robert J. Drake, Tucson, Ariz.—land snails, Mexico; Dr. Robert E. Kuntz, APO 63, San Francisco—a bat, 462 reptiles and amphibians, Formosa.

BIOLOGICAL EDITORS MEET

The Conference of Biological Editors held its second annual meeting in Chicago on April 11 and 12, with Chicago Natural History Museum functioning as host. More than 60 editors of the country's leading biological journals participated in the program. The local arrangements were made by a committee consisting of Dr. Theodor Just, Chief Curator of Botany, and Miss Lillian Ross, Editor of Scientific Publications at the Museum. Dr. Just was elected Vice-Chairman for the ensuing year.

Journeys for Children Continue

May is the final month for children desiring to participate in the spring Museum Journey on "Life of Ancient Seas."

The summer journey, which will be offered through the period from June 1 to August 31 will be entitled "Goin' Fishin'." Details will be announced in the next BULLETIN.

Children wishing to participate in any of the Journeys will be given instructions and questionnaires at either the north or south entrances. Those who successfully answer the questions in four Journeys become Museum Travelers. After eight Journeys there are awards as Museum Adventurers, and twelve as Museum Explorers.

Collecting Birds in Egypt

Melvin A. Traylor, Jr., Associate Curator of Birds, left early in April for a field trip to Egypt. Flying to Cairo, Traylor joined Harry Hoogstraal, Museum Field Associate, who has been stationed there for several years as a member of a U. S. Navy medical research unit. Together with Hoogstraal, Traylor will collect bird specimens and make studies of ornithological problems. For the past three years, Traylor has been engaged in research on birds sent to the Museum by Hoogstraal. After completing his field work, he will probably stop in London, en route homeward, for studies of collections at the British Museum (Natural History).

Visiting Hours Extended for Summer Season

Effective May 1 and continuing through September 7 (Labor Day) visiting hours at the Museum are extended by one hour. The Museum will be open daily, including Sundays and holidays, from 9 A.M. to 6 P.M.

Botanist from Indonesia Here

Dr. A. J. G. H. Kostermans, professor of botany at the University of Indonesia at Bogor, and head of the botanical department of the Indonesian Forest Research Institute, spent a week last month in research on collections in this Museum.

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CHICAGO NATURAL HISTORY MUSEUM

Bulletin

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Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

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Members are requested to inform the Museum promptly of changes of address.

THINGS THAT MAKE A BOTANIST 'TICK'

In the introduction to *Flora of Guatemala*, a recently published scientific volume in the Museum's botanical series, Fieldiana, there occurs a statement that indicates how such scientific research is brought to successful fruition, through the co-operation of many people besides scientists. The statement, with special modifications here and there, would be equally applicable to projects in the other sciences within the Museum's scope—anthropology, geology and zoology. It reveals something of how Museum men become "simpatico" with the countries they explore, and the people they encounter in the course of their work. The authors are Dr. Paul C. Standley, Curator Emeritus of the Herbarium, and Dr. Julian A. Steyermark, former Curator of the Herbarium. They say:

"Almost every botanical publication is the result not of the labor performed individually by its author but of the co-operation over a long period of years of a large number of persons, ranging from learned scientists, some of whom date back to the time of Linné or even earlier, down to the most humble and illiterate peasants. It would be preposterous for any one person at the present time to claim full personal credit for such a piece of work. It is, indeed, questionable whether some of the humblest of the co-operatives, whose names never appear in print, do not often deserve prime credit for their aid.

"At any rate, a very large number of people have co-operated, over a hundred years or more, to make possible the present account of the flora of Guatemala. So far as the botanists are concerned, they all must have enjoyed their work, else they need not have been doing it. Very few botanists ever are forced to travel to foreign lands; rather, they fight for the privilege.

"It is hard to believe that there is any normal person in North America or Europe who would not find something to interest him in Guatemala. Every one would find some phase of nature or man in Guatemala that would be new to him and should therefore hold his interest for at least a fleeting instant. Beauty, perhaps fortunately, can not be measured by any scientific standard, but if it could, Guatemala would have few superiors in natural beauty. Nowhere are there more beautiful and majestic mountains, lovelier lakes and forests, more beautiful wild and cultivated flowers. Nowhere is there a climate that is more agreeable and more invigorating. Nowhere will one find more interesting, more highly varied, and more picturesque people than in Guatemala.

"The people of Guatemala have contributed much more to the accumulation of data on which our *Flora* is based. From the highest to the most humble they have been exceedingly helpful when informed of the purpose in our work of collecting and studying the flora of their country. This is no surprise to one familiar with the people of all Central America. It would be a surprise and at once arouse painful speculation, if the people were otherwise than helpful or agreeable. From the people of pure and mixed Spanish blood the greatest courtesy and consideration are to be expected as a matter of course; it is a racial trait. In Guatemala the Indians and the poor among the *ladinos* yield nothing in breeding to their social superiors. We have found them invariably dignified, courteous, kindly, and hospitable. Some of their standards of kindliness as exhibited among themselves may seem different from ours, but it must be understood that the poor of Central America often fight to exist under the most stern and harsh conditions. What at first glance may seem harsh to us need not be so for people actually concerned in the matter. A northerner may wince and shudder when he sees the heavy work performed by small children, yet let him observe the care with which a father watches over them, and he will realize that there is no intentional cruelty. Certainly no people are more tender and just to their children than the Indians of Guatemala.

"We prefer the Central Americans to help us when we go collecting, and so far as their ability and understanding of the work went, they were beyond criticism.

"It is quite out of the question to mention

(*Continued on page 7, column 1*)

THIS MONTH'S COVER

Our cover picture, entitled "Bearded Lion," is a product of the art-and-design-in-nature classes conducted in this Museum by the School of the Art Institute of Chicago. It is the creation of Bernita Friedman, 11, of 714 Junior Terrace, Chicago, who is in the Junior School of the Institute. It was one of 40 included in a special exhibit at the Museum last month (there was also a selection of work by adult students whose advanced classes likewise rely on this Museum for material used in art studies). The picture is featured here for the sake of readers who missed the exhibit or who haven't really seen a lion recently.

MEMBERS' NIGHT CROWD TOPS ALL RECORDS

Museum Members' Night for 1959, held May 8, drew the largest assemblage of guests ever to attend one of these events—1,620, compared to 1,268 who came for Members' Night in 1958.

The occasion was made more festive by the illumination for the first time of part of the exterior of the building, as a test of the new floodlighting which is in process of installation in conjunction with the city program for public buildings.

The show inside the Museum was dominated by the special anthropological exhibit, "Panorama of the Pacific," which visually told the story of a part of the world that seems to have special allure for nearly everybody—the isles of the South Seas with all their magic and romantic spell—and which presented to the public for the first time anywhere, selected items from the famed Fuller Collection. (Incidentally, for those who missed it, this exhibit will remain on public view through July 15.)

New exhibits in the Departments of Botany, Geology and Zoology also attracted throngs. Throughout the evening, capacity loads of visitors boarded the elevators to the third and ground floors to participate in the open house features in laboratories, studios and offices of the scientific, technical and art staffs where demonstrations were given of techniques employed in the Museum's work. As the evening approached its close, the visitors gathered at the refreshment tables in Stanley Field Hall and the Library, and the crowd seemed to radiate the impression that a gala evening had been enjoyed by all.

Treetop groups of orangs and gibbons are among the interesting habitat groups of Asiatic mammals in William V. Kelley Hall.

A NEW DISPLAY OF ANCIENT MEXICAN ART (900–500 B.C.)

By DONALD COLLIER
CURATOR OF SOUTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

A RECENTLY INSTALLED EXHIBIT in Hall 8 (Ancient and Modern Indians of Mexico and Central America) shows the art of Tlatilco in the Valley of Mexico. The Indians of Tlatilco lived during the middle Pre-Classic period, about 900–500 B.C. The exhibited specimens, which are part of the largest and most representative Tlatilco collection in the United States, were acquired by the Museum as a part of an extensive exchange with the National Museum of Mexico in 1950. The Tlatilcans raised corn, squash, beans, and chili; gathered wild plants, fruits and fibers; and caught fish in rivers and in nearby Lake Texcoco. Their villages of wattle-and-daub houses with thatched roofs sheltered 100 to 300 persons. They did not build mound structures or temples. Little is known of Tlatilcan religion except that there was a cult of the dead.

FIGURINE HEAD OF TLATILCO
In Olmec style.

The finest products of the craftsmen-artists of Tlatilco were pottery vessels and hand-modeled figurines, which were placed in graves along with offerings of red ocher. These potters made polished brown, red, or black vessels in a variety of forms: dishes, bowls, jars, long-necked bottles, stirrup-spout jars, vases, and effigy forms. These were decorated by incising, rasping, grooving, carving, punching, rocker stamping, painting in red or white, and occasionally by negative painting. The effigy vessels depicted men, dogs, pecarries, racoons, birds, and fish. The Tlatilco sculptors made several varieties of figurines, commonly of women and rarely of men, ranging from 2 to 12 inches in height. Most common and characteristic are the charming, delicately modeled female figurines called by archaeologists Type D and nicknamed the "Pretty Girl" type. These have large, slanting eyes, upturned noses, small mouths, and ample hips. Their red-painted hair is worn in several styles, including shaving part of the head. They wear turbans, bands or other head ornaments, and have painted designs on the face and body. Most of them are nude, but a few wear "ballet" skirts. A few have two heads or a double face with two mouths, two noses and *three* eyes, a concept used by Picasso in several paintings.

'GLAMOR GIRL' OF TLATILCO
Face of figurine is painted red and yellow.

A third aspect of plastic art was the making of pottery masks and seals. The masks, with cut-out eyes and mouth, depicted human and jaguar faces. The flat stamps and cylindrical stamps were used to press or roll designs on cloth and the body.

There is evidence in Tlatilco art of a strong influence from the Olmec style, which was flourishing at the same period on the Gulf Coast and seems to have spread also to Morelos, not far to the south of the Valley of Mexico. This influence can be seen in the thick-lipped, "baby-face," and other figurines in pure Olmec style found at Tlatilco, and in bottles and vases incised with feline motifs in unmistakable Olmec style. These highly stylized designs, representing the mouth, gums, claws, and spots of the jaguar, are manifestations of a powerful jaguar-deity cult. Rocker-stamping is also characteristic of Olmec ceramics. Looking farther afield, we find many Tlatilco and Olmec traits, including rocker-stamping, stirrup-spout vessels, negative painting, and cylindrical stamps, in the Playa de los Muertos culture on the Ulua River of Honduras.

TLATILCO HUMAN EFFIGY BOTTLE

A FELINE DEITY

Far to the south many of these traits are found in the widespread Chavin style of Peru. Evidence of this complex in intervening areas—Ecuador, Colombia, and Central America—has been accumulating in recent years. It looks now as if there was a wide diffusion during the middle Pre-Classic period of a complex of ceramic traits, design motifs and the concept of a feline deity within Mesoamerica and from Mesoamerica to South America. Apparently maize, which was domesticated in Mexico or Guatemala, reached Peru at about the same time and probably as part of the same culture spread. The Classic civilizations in both areas developed from this formative complex. It is because of these wide relationships as well as its intrinsic qualities that Tlatilco art is of such interest and importance.

JUNIOR SCIENTISTS PROVE THEIR TALENTS

Scientists of tomorrow gave proof of their ability to meet demands of the future at this year's Chicago Area Science Fair held at the Museum on May 16.

Nearly 125 exhibits filled Stanley Field Hall and brought over 9,000 visitors to the Museum that day. The event, sponsored by the Chicago Teachers Science Association, included the work of children enrolled in the 6th through the 12th grades in Chicago Public Schools and public schools within a 35-mile radius of the city.

Adult visitors to the Museum were greatly impressed by the comprehensive grasp the young students had of their subject matter.

Many branches of science were represented by individual exhibits, and the children provided lucid explanations of them. A panel of judges, who systematically toured Stanley Field Hall visiting the exhibits and listening to the lectures, chose outstanding exhibits as prize-winners.

INDUSTRIAL CHEMISTRY DRAMATIZED
Young science researchers at Chicago Area Science Fair held at the Museum May 16 demonstrate the facts about an industrial process. They are Bob Stickgold of Wilmette Junior High School, and Nancy Bohac of the eighth grade at the Jonas E. Salk School in Rolling Meadows.

One of the most unusual of woody plants, the two-leaved Tumboa, shown as it grows in its native South African desert, may be seen in Martin A. and Carrie Ryerson Hall (Hall 29, Plant Life).

AMATEUR LAPIDARIES DISPLAY CREATIONS

DINOSAUR BONES no longer belong only in museum exhibits and study collections or little boys' pockets. They have taken their place among precious and semi-precious stones as objects for the lapidaries' art.

Seventy-three polished dinosaur bones are one of the unusual prize-winning entries in the Ninth Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition to be on view in Albert W. Harris Hall (Hall 18) of the Museum, June 5 through June 30.

The special exhibit, sponsored by the Chicago Lapidary Club, includes a large and varied collection of cut and polished stones, and finished jewelry. The wide range of originality displayed in creating jewelry in unusual designs is of especial interest in this year's show. Gems mounted in gold and silver, and gold and copper combinations are featured in the exhibit. The display includes the work both of members of the Chicago Lapidary Club and qualified non-members who were awarded prizes or ribbons in a contest that took place last month. All of the contestants live in Chicago and suburbs within a 50-mile radius of the city. Many of them attended lapidary classes held in Chicago Park District field-houses.

The long and intricate processes involved in designing the gems and jewelry, from the first steps of cutting the rough unfinished stones to fashioning them into handsome pendants, bracelets, rings and other pieces of jewelry, were completed entirely by the individual contestants. As they attain more and more experience these amateur lapidaries develop into advanced craftsmen, often equal to professionals.

Two classifications, each divided into ten craft divisions, comprise the special exhibit. The classifications are novice and advanced; novices have had up to two years of experience and the advanced lapidaries more than two. The craft divisions are (1) individual gems, cabochon-cut, (2) faceted individual gems, (3) collections of specific gems, (4) general gem collections, (5) collections of polished pieces or slabs, (6) individual pieces of jewelry, (7) sets of jewelry, (8) enameled jewelry, (9) special pieces, (10) enameled special pieces.

The winners of the five top awards are as follows: Dalzell Trophy (Robert A. Dalzell Memorial) for the exhibit adjudged the "best of the show"—J. Lester Cunningham for his King Size Cabochon Collection; Presidents' Trophy for outstanding lapidary work—Alvin Ericson, for a brilliant-cut blue titinia; Councilmen's Trophy for outstanding jewelry—J. Lester Cunningham, for a ring, pendant and earrings of white tube agate; Juergens Award for best lapidary work by a novice—Virginia Mitchell, for a carved jet medallion; Milhening Award for outstanding jewelry by a novice—Florence Horning, for a set of earrings, pendant, and bracelet of rutilated quartz.

SPECIAL MAGIC SHOW FOR CHILDREN

A special magic show in which several leading professional magicians, and some clowns as well, will appear on the stage of the James Simpson Theatre of the Museum, will be given for children on Thursday morning, July 2. This is the opening program in the summer series presented by the James Nelson and Anna Louise Raymond Foundation. Motion pictures will be presented on each of the following six Thursdays through August 13.

There will be two performances of the magic show, one at 10 A.M., and the second at 11. The movies, titles of which will be announced in the July BULLETIN, will also each be given two showings, with the first at 10 A.M. but with the hour of the second varying considerably.

The performers for the July 2 Magic Show are being booked through the courtesy of the International Congress of Magic which is meeting at the Hotel Sherman from June 30 to July 4. The arrangements were made by the two local host groups, the Society of American Magicians, Chicago Chapter, and the International Brotherhood of Magicians, Chicago Chapter. First magician definitely signed for the program is Frances Ireland, a well-known local member of the profession.

STAFF NOTES

Dr. Clifford C. Gregg, Director, will sail in mid-June for Europe. He will be a speaker at the meetings of the International Council of Museums to be held at Stockholm, July 1–8. The paper he will present is "A Study of Improvement of the Methods of Conservation of Zoological Material." He has also been invited to be a member of an international committee of fifteen which will meet at Oslo, June 28–30 for preliminary discussions in preparation for the Stockholm assemblage. . . . **Rupert L. Wenzel,** Curator of Insects, has been appointed to the advisory board of the *Encyclopaedia Britannica*. He will serve as consultant in the field of entomology. . . . **Gustaf Dalstrom,** Artist of the Department of Anthropology, was awarded the Jules F. Brower Prize at a recent Art Institute show. His successful painting is titled "Cloudy Day." . . . **Dr. Paul S. Martin,** Chief Curator of Anthropology, **Dr. Donald Collier,** Curator of South American Archaeology and Ethnology, and **George Quimby,** Curator of North American Archaeology and Ethnology, attended the annual meeting of the Society of American Archaeology in Salt Lake City. . . . **Dr. Rainer Zangerl,** Curator of Fossil Reptiles, recently gave a seminar lecture at the University of Indiana.

DINOSAUR-GEM FANTASY

Seventy-three selected pieces of petrified dinosaur bone, cabochon-cut and polished to form gems, provide this unique exhibit which won first prize in the specific gem collections section (advanced division) in the Chicago Lapidary Club's Gem and Jewelry Show, on view in the Museum this month. This exhibit is the production of J. Lester Cunningham. It is accompanied in the exhibition hall by the well-known jingle "The Dinosaur," written in the '20's by the late Bert Leston Taylor, famed as the original columnist of the *Chicago Tribune's* "A Line-o-Type or Two." Following are Taylor's verses:

Behold the mighty dinosaur,
Famous in prehistoric lore,
Not only for his power and strength
But for his intellectual length.

You will observe by these remains
The creature had two sets of brains—
One in his head (the usual place)
The other in his spinal base.

Thus he could reason 'A priori'
As well as 'A posteriori.'
No problem bothered him a bit
He made both head and tail of it.

So wise was he, so wise and solemn,
Each thought filled just a spinal column.
If one brain found the pressure strong
It passed a few ideas along.

If something slipped his forward mind
'Twas rescued by the one behind.
And if in error he was caught
He had a saving afterthought.

And as he thought twice before he spoke
He had no judgment to revoke.
Thus he could think without congestion
Upon both sides of every question.
Oh, gaze upon this model beast,
Defunct ten million years at least.

Annual Report on Press

The Annual Report of the Director for 1958, a book of 175 pages with 25 illustrations, covering the activities of all departments and divisions of the Museum, is on the press. Distribution of copies to all Members of the Museum will begin soon.

MUSEUM COLLECTORS' ADVENTURES IN PANAMA

By ALAN SOLEM
CURATOR OF LOWER INVERTEBRATES

THE PANAMA Zoological Field Trip was terminated in early April with the return of Henry S. Dybas, Associate Curator of Insects, and the writer. Equipment and specimens are en route to Chicago from Panama City, and the nearly 20,000 mollusks, even more insects, and assorted spiders, snakes, frogs, lizards, and millipeds will be many months in processing for the collection, and study by the collectors and many other scientists.

As important to our studies as the specimens are the ideas and impressions obtained from the tropical environment. Dybas had not been in the continental tropics since 1941 and this was my first trip to any tropical region. We were both entering a new world of experiences and rapidly shed many preconceived notions.

One of our main interests was to compare the snail and insect faunas of original forest

PANAMA'S LARGEST GROUND SNAIL

The adult, 2 to 3 inches in size, is hidden behind the teeth of the aperture, which may serve as protection against predacious insects. The young snail (fully extended) has no apertural teeth. Commonly encountered in the wet season, these snails burrow deep into the soil during dry periods. On Barro Colorado, a Museum collector took by force the only living specimen seen from a coati-mundi who had intended to lunch on it.

areas and the cultivated fields and recently abandoned areas of human habitation. By seeing the changes in animal life which occur in going from "natural areas" to human habitation, eventually some information helpful to man's settling tropical areas might accumulate. To orient ourselves, we spent three weeks on Barro Colorado Island in the middle of the Panama Canal.

ABUNDANT ANIMAL LIFE

When Gatun Lake, which furnishes water to operate the canal and forms the central channel, was made by damming the Chagres River, the big hill called Barro Colorado became an island. In 1923 it was set aside as a wild-life reserve and since then has been undisturbed except for the poking and prying of scientists and poachers. Perhaps nowhere in tropical America can so many mammals be easily seen by visitors. Monkeys, sloths, peccaries, coati-mundi, armadillos, ant-eaters, and agoutis can all be seen in the wild within a day or two of one's arrival. The rest of Panama is a startling contrast. In two months after leaving Barro Colorado we saw one armadillo, two squirrels, and three rabbits.

But our main interest was in the snails, and tiny insects of the forest floor. We had planned our trip to arrive at the end of the rainy season and try and follow some of the species into the places where they aestivate during the dry season. Forest floor animals need moisture in large quantities and during the dry season must hide deep in the soil or in tiny pockets of moisture. Unfortunately, the dry season came a month earlier than usual, and living snails proved almost impossible to find. An additional problem was caused by the fact that Barro Colorado had in the past 100 years probably been completely cut over several times. Botanists consider that it is rather scrubby second-growth forest and it probably does not have as rich a soil fauna as a more mature forest.

PROTECTIVE FORMATION

Perhaps the most striking part of our stay on Barro Colorado was the nightly display of insects attracted to the lights of the station. Over 500 species of moths were seen and large numbers of protectively colored grasshoppers and mantids. Many of the more spectacular insects were captured alive and the next day posed against a natural background for photographing. On unnatural backgrounds the insect would wander restlessly or fly away, but if the proper setting could be found they would pose for minutes without moving. Most of the mantids would assume a hunting posture, but we were most impressed by the grasshoppers. Many are obviously shaped like leaves, some even with rust spots on their wings, but to see one species with a pointed

LEAF MIMIC

Grasshopper-like insect, related to the katydids, on branch of a tree on Barro Colorado Island, in the Panama Canal. It provides a perfect example of the principle of protective resemblance in nature.

brown nose put the nose against a twig and hold its body like a leaf growing from the twig is a sight no biologist would forget.

Three weeks passed all too quickly and we then moved to Panama itself to seek out moist, mature forest. Areas which can be reached easily have long since been cut over and planted to crops, and the dry season means just that—no rain whatsoever. Mountain slopes brushed by the Atlantic winds were still moist and at Cerro Campana and El Valle we did find moist forest pockets, but even here it was not the mature forest we sought.

BOUNTIFUL YIELD OF SPECIMENS

Finally, in the mountains of Chiriqui in western Panama we found the right conditions. A stand of virgin timber, protected for 40 years by a naturalist, but now being cut, yielded more specimens than any area of equal size I've ever encountered. Four days were spent collecting minute snails in an area not more than 50 feet in diameter. Probably 25 species of land snails, only four of them previously recorded from Panama, were found in this one patch of forest. A striking contrast was seen in a coffee grove 400 feet away which had three species of snails. It would be hard to find a more dramatic example of how man's activities alter the native fauna.

The collecting trip is over, and months of sorting, labeling, dissecting, measuring, and careful study of the specimens await. The sometimes tedious compilation of factual data will be lightened by remembering the live land snail saved from a coati's lunch for the collecting bottle, or the freshwater snails that interrupted one village's washday. Most important, the interpretation of the compiled facts will be immeasurably aided by having seen the animals where they live and not just as specimens in a glass tube. A much more critical, deeper knowledge of the snail can be acquired after seeing it where it lives than ever could be done from a dead specimen.

TWO NEW CONTRIBUTORS ELECTED BY TRUSTEES

Captain A.W.F. Fuller, of London, was elected a Museum Contributor at a meeting of the Board of Trustees on May 18. The honor was in recognition of his gift to the Museum of a unique and valuable "hei-tiki" of green jade from New Zealand. A hei-tiki is a large and heavy idol formerly worn as a neck-pendant by Maori chiefs under the old religion of the islands. The specimen from Captain Fuller is one of the finest pieces of its kind in the world, and was brought to the Museum on behalf of the donor by Houston M. McBain, First Vice-President of the Museum, upon his return from a recent visit to Britain.

Also elected a Contributor (posthumously) was Dr. Jesse R. Gerstley, of Chicago, in recognition of a gift in stocks and cash.

THROUGH RAIN-FORESTS IN CENTRAL MALAYA

By D. DWIGHT DAVIS
CURATOR OF VERTEBRATE ANATOMY

THE INTERNATIONAL Biological Congress held last December at the University of Malaya in Singapore, the first such congress ever held in Malaya, was an outstanding success. Guests from twelve countries, representing four of the five continents, participated in the program, which ran from 8:30 in the morning to 5 in the afternoon every day for a week, with lectures and discussion groups each evening. Sunday was taken up with conducted field trips to places of special biological interest on Singapore Island. The general theme of the congress was divided between evolution, especially as it is seen in the tropics, and tropical ecology. The writer was official representative of Chicago Natural History Museum.

I had planned, following the congress, to spend about two months in the field in various parts of Malaya, exploring the country and collecting specimens for the Museum's reference collections and exhibition halls. Thanks largely to the extraordinary generosity of John R. Hendrickson, of the Zoology Department of the University of Malaya, it was possible to carry out this program in the short time I had available. Together we visited representative lowland areas in various parts of central and southern Malaya, including several localities of historical interest because they were worked a century ago by Alfred Russel Wallace and described in his classical work *The Malay Archipelago*. The spirit of Wallace, who with Charles Darwin propounded the currently-accepted theory of evolution, was much in evidence during the congress and throughout my stay.

CIVILIZATION LEFT BEHIND

Our first trip was to the King George V National Park, an area of about 1,700 square miles in central Malaya. The park is reached by an overnight train trip on the "Golden Blowpipe" from Singapore to Kuala Tembeling, where civilization ends and the train turns northwest on its way to the Siamese border. The last 50 miles to the park is an all-day trip by small river boat up the Tembeling River to park headquarters at the mouth of the Tahan River. The park is a virgin rain-forest, much of it still unsurveyed, and is without roads and has only a few jungle trails. It is typical of the immense Indo-Malayan rain-forest that once covered much of southeastern Asia, but has been destroyed or seriously damaged by man over most of its former range. Destruction of the remnants of the forest is still going on; in western Malaya we walked through a new clearing where the stumps of giant forest trees were still smoldering among newly-planted seedling rubber trees.

Rain-forest is an endlessly fascinating feature of the tropics to biologists. It is more favorable to life than any other land habitat, and here life has evolved with an exuberance unmatched anywhere except in certain parts of the sea. The biological problems are almost overwhelming, and challenging new questions come up daily during field work. One of the results of this favorable environment is that it provides a haven for archaic forms that elsewhere have lost out in the struggle for existence. This extends even to primitive human cultures, and one of the memorable events during our travels in the park was to stumble upon a group of pigmy Negritos, whose culture is as primitive as any that survives today. Naked except for a skimpy loincloth and armed with blowguns and poisoned darts, these people have no fixed abode but wander in the forest as nomads, hunting and gathering food. Later we came upon a spot beside the trail where these same people had the day before been digging edible roots from the jungle floor.

Subsequent trips took us to Bukit Serampang, on the flanks of Mount Ophir on the Malacca border, and to Gunong Pulai and other mountain areas in southern Malaya. All the lowland parts of southern Malaya have been cleared and are under intensive cultivation, mostly rubber, and the only remaining vestiges of the original forest are on hills and mountains unsuited to cultivation. Fortunately a good deal of the plant and animal life of the Malayan rain-forest is able to make a go of it in these patches of forest, and may be expected to survive there as long as the trees are left standing. Much of the biology of the rain-forest can be studied effectively even in these situations. Here too the visitor often sees for the first time things he previously knew only from books. I will never forget my first sight, in such a patch of forest, of the giant pitcher plants for which the Indo-Malayan forest is famous among botanists. Slogging cross-country through a particularly bad patch of forest in western Johore, I almost stepped on them, a cluster of globular pitchers, each the size of my fist, on the forest floor. Later I saw bigger and more spectacular species of pitcher plants in other parts of Malaya, but none had the impact of the first encounter.

NEW YEAR'S EVE IN THE MALAYAN JUNGLE

Celebrating a successful collecting trip as well as the beginning of 1959, Curator D. Dwight Davis, expedition leader (at extreme right) attends party with his associates in camp on the flank of Mount Ophir.

COSMOPOLITAN PARTY

The composition of our field parties varied from time to time, but always had an international flavor. We happened to be in the Mount Ophir area at the end of the year, and our New Year party was a truly polyglot affair. Seven of us—two Americans, two Chinese, two Malays, and an Iban from western Borneo—welcomed the new year crowded together in a little thatch lean-to in the jungle, with conversations going on in four languages and the heavy air of the jungle night perfumed with the odor of joss sticks burning to repel mosquitos. Our orchestra for this occasion was the distant hallooing of a Tamil rubber planter, shouting throughout the night to drive sambar deer away from his young rubber trees. It was a proper climax for a day in which we had succeeded in getting tape recordings of the astonishing progression of jungle sounds that accompanies the change from late afternoon to evening, and then later had had the good fortune to collect two species of giant flying

squirrels, each the size of a small cat, within a few yards of each other in the forest.

The ecology of the tropical rain-forest is being studied by a small but enthusiastic group of botanists and zoologists in Malaya. To a considerable extent these men are dependent upon background studies that can be made only in the great museums of America and Europe. The interchange of ideas that results from occasional working together in the field is of immense benefit to both sides, and a formal congress such as the one recently held in Singapore is an equally important step in the direction of scientific teamwork.

This trip was financed in part by a grant from the National Science Foundation.

HOW BOTANTIST "TICKS"—

(Continued from page 2)

here all the persons to whom we are indebted for assistance in our field work in Guatemala, their help often of a most practical and frequently very substantial nature. We are sure they do not expect thanks beyond those offered at the time their services were performed."

Of interest also is a section of Standley's and Steyermark's plan of the Flora, viz.:

"We have collected most of the vernacular names [of the plants covered by the book]. Others have been taken from the labels of other collectors, and some from publications whose accuracy we trust. . . . The vernacular names entered here doubtless include some mistakes, even after the best of care, and this is particularly probable in case of non-Spanish terms.

"There is much more to be done in the field of Guatemalan vernacular names. In published lists we have seen many plant names whose identity it is impossible to guess. The value of a particular vernacular name varies usually in proportion to the importance of the plant. If the plant is one of which some definite use is made, or a showy and conspicuous one, the vernacular name is likely to be fixed and in common usage. If the plant is inconspicuous, or if no use is made of it, the vernacular name often is open to suspicion and seldom is in common use. However, the local standards of importance and individual ideas of beauty or conspicuousness may differ from those of the questioning botanical collector. It always is unwise to press for a vernacular name, and it is much better to ask for one indirectly. Many people have a talent for manufacturing them on the spot and find great satisfaction in fooling a foreigner and boasting about it afterwards. The senior author greatly admired the ability in this respect of a small boy at Jutiapa. He happened to have a remarkable knowledge of the plants of the region, but he was not content with what he really knew. He would invent a name almost as quickly as a new plant was found, and his names often were extraordinarily suitable and subtle—too much so for belief. Adults in country districts think they will lose face if they can not supply a name for any plant found, and will often make a clumsy effort to manufacture one. And a great many Central Americans, like natives of the United States, make mistakes in recognition of plants, thus giving them incorrect names belonging to other plants. People who recognize wild plants easily when in the ground, often are unable to place them when they see a detached branch in a work room. Woodsmen usually pay more attention to the bark and trunk of a tree than to any other portion of it, and if reliable names for trees are desired, it is better to obtain them from a qualified person standing by the tree in question."

Books

DIGGING INTO HISTORY. By Paul S. Martin; drawings by Gustaf Dalstrom. 157 pages, 48 halftones, 15 text-figures, 1 map. Chicago Natural History Museum —Popular Series, Anthropology, No. 38. $1.50.

Digging into History is the story of fifteen years' investigation of the prehistoric Indians of west-central New Mexico, under the leadership of Dr. Paul S. Martin, Chief Curator of Anthropology at Chicago Natural History Museum. This handsome book is written for the non-specialist and the beginning student, and not only sketches the life of the people, as it can be inferred from their rubbish and their ruined houses, but also undertakes to explain the purposes and procedures of archaeology. This dual aim results in a book with a great deal of food for thought, and the many definitions and explanations sometimes crowd so closely that careful reading is needed. The story of the past is interrupted with interesting discussions of the means by which archaeologists find and interpret the evidence for that story.

The narrative of *Digging into History* begins very near the beginning of human history in the New World, for the Southwestern United States is one of the regions through which the first migrants from Asia wandered. Besides hunting big game—bison and elephants, particularly—the wandering bands also gathered the seeds of many wild plants. Through their increasing familiarity with the possibilities of plant foods, they slowly came to place greater and greater dependence on maize, and by 500 B.C. it was their mainstay. Both hunting and the gathering of wild plant foods continued but declined in importance; the increasingly large and numerous permanent agricultural communities depended chiefly on maize, beans and squash. Settled life and a more certain food supply were accompanied by changes in almost every other aspect of life, and Martin describes the changes through the centuries in house architecture, village plans, dress, religious practices, and all the other aspects of the Indians' lives for which evidence has been unearthed.

Although there are a few comments on the relationships of this corner of the Southwest to other regions, the emphasis in this book is on the long record of slow but persistent change in this one small area. It is an impressive record, spanning some 10,000 years, and it is instructive of the ways in which man both depends on his natural environment, with all its constraints, and also continually discovers new means of transcending its momentary limitations. Martin tells the story with both imagination and proper scientific restraint. Everyone who has an interest in Indians, in the past, or in learning how history is unearthed will find this book enjoyable reading.

RICHARD B. WOODBURY
University of Arizona

SPECIAL EXHIBITS

The following special exhibits are scheduled for the summer months:

Panorama of the Pacific, through July 15, Stanley Field Hall. This exhibit, which was the feature of Members' Night, May 8, displays selected material from the Fuller Collection of South Seas artifacts.

Amateur Gem and Jewelry Show, sponsored by the Chicago Lapidary Club. June 5–30, Albert W. Harris Hall (Hall 18). *See story on page 4.*

The Music Makers—Exotic Musical Instruments of the World. June 24-August 31, Edward E. and Emma B. Ayer Hall (Hall 2).

Indian Art of the Americas, August 1-September 30, Stanley Field Hall. Selected *objets d'art* from the North, Central, and South American collections of this and other leading museums. The exhibit coordinates with Chicago's Festival of the Americas in connection with the Pan American Games.

Museum Books Recommended on List for Schools

Three books published by the Museum are listed in "An Inexpensive Science Library," a catalog of paperbound books recommended for high school libraries, published by the American Association for the Advancement of Science and the National Science Foundation. The Museum selections occur in the list of 30 titles in the section on archaeology and anthropology. They are: *Prehistoric Men,* by Robert J. Braidwood; *The Civilization of the Mayas,* by J. Eric Thompson, and *People of the South Pacific,* by Albert B. Lewis.

A 'FISHING' EXCURSION OPEN TO CHILDREN

Some of the most interesting and unusual living animals are found in the earth's numerous bodies of water. For an introduction to these animals, both rare and common, the Museum offers its summer journey for children—"Goin' Fishin'."

The Journey, presented by the Raymond Foundation, will direct youngsters to the Hall of Fishes where they will see fresh and salt-water fishes that make their homes in lakes, tropical oceans, warm coral seas, and tide pools. Sharks and rays feared by man, exotic inhabitants of a Bahama coral reef, bizarre living fossils, and more common North American fishes that might be hooked on a vacation fishing trip are some of the animals that boys and girls will see and learn about.

Questionnaires, obtainable at the north or south entrance to the Museum, take the place of rods and reels on this fishing trip, which is open to all children visiting the Museum any day in June, July or August.

This Journey and three others successfully completed entitle a child to an award as a Museum Traveler. After eight different Journeys he may become a Museum Adventurer. After twelve Journeys he may be a Museum Explorer. Sixteen Journeys entitle him to take a very special Journey, which admits him to a Museum Club.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology

From: Mrs. Joel Baker, Nashville, Ohio—woman's gown, Manchuria; Mrs. Robert C. McNamara, Winnetka, Ill.—3 pottery vessels, Arizona and New Mexico

Department of Botany

From: Holly Reed Bennett, Chicago—640 phanerogams, Michigan; Chicago Academy of Sciences—specimen of *Asimina triloba*, Missouri; Instituto Nacional de Pesquisas da Amazonia, Bélem-Pará, Brazil—63 specimens of Lentibulariaceae; Mrs. Dorothy Gibson, Chicago—30 vascular plants, Kentucky; Dr. Louis O. Williams, Beltsville, Md.—3 specimens of *Tetrorchidium*, Honduras

Department of Geology

From: Arthur Hahn, Chicago—a fossil cephalopod, Illinois; Robert E. Houston, Greenville, Miss.—slab of marcasite; Martin Seifert, Carrollton, Tex.—4 Cretaceous invertebrates; Mrs. C. E. Thatcher, Brookfield, Ill.—2 slabs nephrite jade; Mr. Tricomi, Chicago—amethyst quartz with pyrite, Ontario

Department of Zoology

From: Dr. R. M. Darnell, Milwaukee—5 fish specimens; J. W. Donovan, Palm Beach, Fla.—a fresh-water snail, Lake Tanganyika, Africa; Dr. John R. Hendrickson, Singapore—a caecilian, 98 frogs, 12 turtles, a fish; Celestino Kalinowski, Peru—397 insects; Dr. J. N. Knull, Columbus, Ohio—27 beetles, Southwest United States; N. L. H. Krauss, Honolulu, Hawaii—4 lizards, New Caledonia and New Hebrides; Dr. Marshall Laird, Quebec, Canada—36 lizards, Tokelau Islands; Dr. Jean Rageau, Noumea, New Caledonia—13 lots of non-marine shells; Sea Fisheries Research Station, Haifa, Israel—16 fish specimens, Mediterranean and Red seas

NEW MEMBERS

(April 16 to May 15)

Life Member

John McKinlay, Jr.

Associate Members

Alfred C. Ames, John T. Barlow, Dr. Hugo C. Baum, L. B. Buchanan, Mrs. John Wheaton Cameron, George V. Campbell, William S. Deree, James F. Duffy, Carl Gustafson, M. J. Holland, Mrs. William O. Hunt, Byrne A. Jackson, Robert B. Jarchow, Lawrence Kasakoff, Mrs. Jerry J. Kearns, J. E. Levering, Colonel M. M. Philipsborn, Jr., Byron M. Sykes, Paul H. Tolpin, Mrs. Murray Vale, Norman Vaughan

Sustaining Member

Nathan E. Jacobs

Annual Members

Ralph J. Abramson, Harry Adler, Kenneth H. Anderson, William Apatoff, Mrs. Albert I. Appleton, Mrs. Leo Arnstein, Mrs. Floyd G. Arpan, Mrs. Walter G. Ashton, Mrs. Wallace G. Atkinson, Mrs. George M. Avalon, Mrs. C. Avgerinos, Dr. John J. Ballenger, Isadore Baskin, Dr. B. B. Batko, Jack W. Baum, Dr. Ralph Baylin, Dr. Barry O. Beguesse, Paul Bere, W. H. Binford, Charles W. Boyd, Hartman L. Butler, Jr., Mrs. Louis Crawford, Roger Eklund, Kenneth G. Enright, Reuben S. Flacks, A. C. Friedsam, Ralph A. Gabric, Chester N. Goltra, Morton Haberman, Raymond Harkrider, Miss Nettie Hart, Dr. Eugene Hoffmann, Vincent P. Ignowski, Michael L. Igoe, Jr., Spencer E. Irons, Aaron M. Jacobs, Aaron Jaffe, James J. Kane, Constantine N. Kangles, Wallace I. Kargman, Eugene Kart, Bernard B. Kash, Daniel D. Kaufman, John C. Kayner, Marshall V. Kearney, Delmar L. Kroehler, R. C. Leimbacher, Mrs. J. H. Luken, Paul W. Majerus, John Neukuckatz, Robert C. Ransom, Sr., M. Hudson Rathburn, Mozart G. Ratner, Richard S. Raysa, James E. Rhines, Mrs. Paul Russell, George Q. M. St. George, Gerald B. Saltzberg, Bernard S. Sang, Leonard B. Sax, Morris Saxner, C. Stuart Siebert, Jr., Henry J. Spanjer, Jr., Eugene Strojny, O. H. Warwick, Mrs. M. R. Wendt, Dean Wessel, Lawrence H. Whiting, Dr. George E. Ziegler

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

MUSEUM TO BE OPEN SOME EVENINGS

In co-operation with the Chicago Park District, Chicago Natural History Museum will extend its visiting hours to 8 P.M. on Wednesday and Friday evenings during the Grant Park concert season, June 24 to August 12. On these evenings the exhibits will be open to visitors, and dinner will be served from 5:30 to 7:30 P.M. in the Museum Cafeteria for the convenience of concert-goers and others.

Musical Instrument Exhibit

"The Music Makers," a special exhibit of primitive musical instruments of the world, will be on display from June 24 to August 31 in Edward E. and Emma B. Ayer Hall (Hall 2). Various forms of wind, percussion and stringed instruments used by native people in Africa, Asia, Pacific islands, etc. will be shown. Many of these are quite fabulous in design as well as tone.

More Parking Available

Additional parking space is now available to Museum visitors. When the free parking space to the north of the Museum is filled on Saturdays and Sundays, the Chicago Park District will permit visitors to leave their cars in the lot at the southeast corner of the Museum for a 25-cent fee, from 10:30 A.M. to Museum closing time. These facilities will be opened also on weekdays during the summer whenever the number of Museum visitors' automobiles requires the additional space.

Field Work in Insects

In June, Rupert L. Wenzel, Curator of Insects, will leave on a collecting trip through the Great Plains of the northern United States, and of Saskatchewan and Manitoba in Canada. In addition to collecting, he will devote much of his time to studying the ecology of specific localities in order to explain the puzzling distributions of certain beetles of the family Histeridae. He will return in late July.

Technical Publications

Fieldiana: Anthropology, Vol. 49, No. 1. *Late Mogollon Communities. Four Sites of the Tularosa Phase, Western New Mexico.* By Paul S. Martin, John B. Rinaldo, and Eloise R. Barter. 144 pages, 57 illustrations, 5 tables. $4.

Fieldiana: Zoology, Vol. 39, No. 8. *The Venomous Coral Snakes of Trinidad.* By Karl P. Schmidt. 9 pages, 3 illustrations. 25c.

Fieldiana: Zoology, Vol. 39, No. 10. *Geographic Variation in the Central American Colubrine Snake, Ninia Sebae.* By Karl P. Schmidt and A. Stanley Rand. 25c.

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Bulletin

Vol. 30 No. 7
July 1959

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

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Members are requested to inform the Museum promptly of changes of address.

NORTHWESTERN U HONORS PRESIDENT STANLEY FIELD

At its commencement exercises held June 15, Northwestern University conferred on Stanley Field, President of the Museum, an honorary degree of Doctor of Laws. The honor was in recognition of Mr. Field's many years of service to civic institutions of Chicago, particularly this Museum, but also to the Chicago Zoological Society (Brookfield Zoo), and the John G. Shedd Aquarium. He has not only been President of the Museum for more than 50 years, but has been President of the Aquarium since its founding. He is one of the guiding spirits of the Zoo, having served many years as chairman of its Building and Grounds Committee and its Executive Committee.

STANLEY FIELD

This is the second time an LL.D. degree has been conferred on Mr. Field. In December, 1930, this honor was bestowed by the University of Chicago. In the nearly 30 additional years that have intervened he has been tireless in his activities, and it is most appropriate that the Chicago area's two leading universities should have conferred upon him their highest commendation.

Books

A CENTURY OF BIOLOGICAL RESEARCH—Bulletin, Illinois Natural History Survey. Vol. 27, Article 2, pages 85–234, 25 figures.

The Illinois Natural History Survey from its beginning has been a unique organization covering fields of research and investigation that in most other states are the concern of several separate commissions. Its founders, Benjamin Walsh, William LeBaron, Cyrus Thomas, and its chief for 60 years, Stephen Forbes, were the men who built the institution, set its high standards and indicated the fields of investigation in which the survey has made its principal contributions.

This stock-taking publication begins with a history of the founding and development of the Survey by Dr. Harlow B. Mills, the present chief. The remaining eight chapters by other staff members cover various aspects of the work of the present organization as follows: Economic Entomology—Decker; Faunistic Surveys (since 1923 principally insects)—Ross; Applied Botany and Plant Pathology—Carter; Aquatic Biology—Bennett; Wildlife Research—Scott; Publications and Public Relations—Ayars; Library—Warrick; and Former Technical Employees—East. Each of the chapters follows a similar outline with a chronological account of the section organization, development of its major research programs and a discussion of future needs in this field. "Throughout its century of existence this organization has attempted to meet the needs of the economy of Illinois with an eye to the state's future requirements" (Ross).

LOREN P. WOODS
Curator of Fishes

Assistant Curator Named in Mammal Division

Dr. Karl Koopman has been appointed Assistant Curator of Mammals, and has begun his duties. Born in Honolulu, Dr. Koopman has lived on the mainland since he was two years old. He received his undergraduate and postgraduate training as a zoologist at Columbia University, and in 1949 was awarded the University's Newberry Prize for excellence in vertebrate zoology.

Dr. Koopman taught biology in Queens College, Flushing, New York, from 1952 to 1958, and was assistant curator of mammals at the Academy of Natural Sciences of Philadelphia before coming here.

A new sparkle has been added to the exhibits pertaining to the peoples of the Malay Peninsula and Indonesia by rearrangements and reinstallations recently made in Hall G.

THIS MONTH'S COVER

With its new exterior silhouette-lighting, the Museum building has become a jewel-like spectacle each evening for thousands of motorists on the Lake Shore Drive, and for thousands of other persons in Grant Park for the summer concerts and other attractions.

NEW MEMBERS OF MUSEUM

(May 18 to June 15)

Associate Members

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SPECIAL EXHIBIT SHOWS EXOTIC MUSICAL INSTRUMENTS

By PATRICIA McAFEE
ASSOCIATE EDITOR

MUSIC is often called the universal language. This is appropriate in the sense that all people participate or at least listen to some form of music. But in another respect music is no more communicatively universal than is speech. Man has the ability to speak and this has led to the development of distinct languages which enable him to communicate with other human beings. But there still is no universal language with which all people can communicate—and just so, there is no music that is understandable, or melodious, to all ears.

MUSEUM 'COMBO' IS BORN

E. John Pfiffner (left), known in jazz-music circles as well as for his work as Museum Staff Artist, and Allen S. Liss, Custodian of Collections—Anthropology, try a few "hot notes" on exotic instruments. Pfiffner is playing a nagasarum, a type of clarinet from India. Liss essays a wild beat on a saron, Javanese form of xylophone.

We with our Western background would recognize music of many other cultures only as sounds or noises. But in the context of the society which engendered it, these other forms of music possess a definite communicative function—a function largely limited to one particular culture alone. For that matter, there are definite musical cleavages among groups within our own society. To the "long-hair music" group most jazz, and all rock-'n'-roll are as separate and uncommunicative as the music of the most primitive culture, while to some of the adherents of these varieties of American-European music, both the old masters and the modern classics are equally incomprehensible.

WIDE VARIETY IN EXHIBIT

"The Music Makers," as a current special exhibit of exotic musical instruments is called, exemplifies the great diversity in the "universal language" of music by presenting a wide variety of musical instruments from many parts of the world. Music-making devices of North and South American Indians, and of peoples of Asia, Africa, and Oceania make up the exhibit, which is in Edward E. and Emma B. Ayer Hall (Hall 2) and will remain on display until August 31. In one respect most of the exotic instruments are similar to those of our own civilization — most of them fall into the same three main divisions of strings, winds (including reeds), and percussion.

THE MUSIC MAKERS, special exhibit described in the accompanying article, will continue on display through August 31, in Edward E. and Emma B. Ayer Hall (Hall 2). For music lovers attending the Grant Park Summer Concerts offered by the Chicago Park District, the Museum will extend its visiting hours to 8 p.m. on Wednesday and Friday evenings through August 12. Dinner will be served in the Cafeteria to 7:30 p.m.

Museum visitors will find some of the music makers in the exhibit totally unfamiliar, while others will register as familiar because of their resemblance in form to Western instruments. This similarity in many cases may exist only in appearance, however; the sound produced is very apt to be foreign to our ears because we are accustomed to the fixed tonal values of Euro-American music. The function is likely to be equally alien to our conception of the use of musical instruments.

In Western societies music has taken on an importance in its own right—music for the sake of music. It is listened to chiefly for the purpose of deriving pleasure. Many of the music makers displayed in this exhibit were used to perform definitely less secular functions. Some were played in the theatre and as an accompaniment to the dance, but thespian and terpsichorean arts may have had religious or ceremonial overtones now rarely present on the stage or in Western music. Other instruments are known to have been used strictly in religious ceremonies. There is still considerable mystery about the use and method of playing many non-Western instruments, particularly those which are ancient.

SPECIFIC INSTRUMENTS

The use of a small double whistle, one of the archaeological pieces displayed, is unknown. It is the product of 15th century Aztec civilization in the Valley of Toluca. The whistle produces three tones and has a small hole in the back which probably enabled the owner to insert a string to carry it around his neck. Little else is known about it.

Several Tibetan instruments are displayed. Tibetan civilization traditionally has been oriented to religion, and the musical instruments of this culture play a large part in rituals. A flute made from a human thigh bone, a conch-shell trumpet mounted with silver and turquoise, and a *lapa*—a 9-foot long copper trumpet, were used in religious ceremonies and, as in the case of the conch-shell trumpet, were also part of the religious paraphernalia which resided on the altar.

CO-ED COMPLETES TRIO

Susanne Fried, Antioch College student-worker temporarily employed at the Museum, plays a sitar—a guitar from India.

Primitive societies are chiefly concerned with music as an important factor in religious ceremonies, suggesting that music may have originated from religious practices and later, in some cases, assumed a more secular function. In the exhibit is a friction drum from New Ireland that was used in rituals to honor the ancestral dead. It is reported that preceding the ceremony a number of men, forming a sort of orchestra, hid themselves in the second story of the house where representations of ancestors were displayed. At the proper time the men stroked the drum with their hands, heating it by friction, and producing a sound which gave the illusion of the presence of supernatural beings.

The use of the friction drum to produce noises suggesting the supernatural is similar in this respect to the use of the bull-roarer by Melanesian people of the Gulf of Papua in New Guinea. A bull-roarer is a long, narrow piece of wood attached to a string which makes a whirring or humming sound when it is whirled in the air. Bull-roarers are found in many areas of the world and are mainly ceremonial in use. The wide geographic range, and the diversity of peoples among whom bull-roarers are found, is illustrated

(Continued on page 6, column 3)

'FEAST OF DEAD' RELEASED HURONS' SOULS

By GEORGE I. QUIMBY
CURATOR OF NORTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

THE HURON and their close relatives, the Tionontati or Tobacco Huron, lived in Ontario between Lake Simcoe and Georgian Bay and westward of Lake Simcoe to Lake Huron. The combined Huron and Tobacco Huron are estimated to have had a population of 45,000 to 60,000 persons at the beginning of the 17th century. However, by the middle of the 17th century their numbers had been reduced drastically by introduced diseases, war, and famine, and the tribal remnants had been driven from their homeland.

HURON BURIAL CEREMONY

An old print shows an artist's conception of a mass reinterment ritual that was believed by the Indians to release the souls of the dead.

The Hurons lived in towns and villages some of which were protected by circular palisades. Within the towns and villages, houses were arranged in regular rows along streets and separated from one another for protection against fire. One of the largest of the Huron towns, Cahiagné, contained 200 large dwellings in which lived 4,000 to 6,000 persons.

The Hurons obtained their food by farming. In the cleared fields near their towns and villages they raised corn, beans, squashes, and sunflowers for sustenance and tobacco for smoking. The men cleared the land of trees and brush by cutting and burning, but the women planted the food crops, tended the fields and did the harvesting.

It has been estimated that the Huron harvested 390,000 bushels of corn annually and that they had 23,300 acres of corn under cultivation. There must have been miles of fields surrounding the Huron villages. So extensive were these fields that one French missionary got lost in them while walking from one village to another.

The Hurons had the most elaborate social and religious life of all the Indians living in the Upper Great Lakes region. They believed that the world was perched on the back of a giant turtle. The sun at night disappeared into a tunnel in the earth and came out at the opposite end each morning.

The supernatural creator of the world and of the Huron people was named Yoscaha. He was a benevolent spirit who lived in the sky. His grandmother, Ataensiq, seems to have been an evil spirit. There was also a class of numerous spirits called Oki who had power for both good and evil. The Oki were present in rivers, rocks, and other places, in animals, and in situations such as voyages, fishing trips, trade, war, and ceremonial feasts. The Oki seem to have been expressions of a power similar to the manitou of the Algonkian speaking peoples. The power of the Oki was also present in amulets and charms of various kinds kept by the Hurons. The Oki manifested themselves to individual humans in dreams. The Hurons believed that dreams were the language of the soul.

The soul, according to the Huron, had five aspects or conditions of being. It animated the body and gave it life. It was possessed of reason. It enabled thinking and deliberation. It made possible affection for others. And it separated itself from the body after death.

VILLAGES OF SOULS

The Hurons believed that souls, after death, went to various villages of souls in the sky. These soul villages of the Huron afterworld were devoid of reward or punishment and supernatural life in them was essentially the same as natural life on earth.

Some souls after death followed the Milky Way, the road of souls, to a great soul village toward the setting sun. They journeyed together, dressed in fine robes and carrying their equipage, all taken with them in soul form from their common grave.

Other souls such as those of very old people and young children not capable of a long journey traveled to a different soul village less distant. Souls of Hurons killed in war also had a separate village.

Souls did not go to their respective soul villages until after an elaborate mass burial ceremony known as the Feast of the Dead.

Ordinarily when a Huron died his corpse was placed in a bark coffin raised on painted wooden posts nine or ten feet high, but those killed in war or drowned were buried in a flexed position in shallow graves. Souls of these Indians remained in the vicinity of the Huron villages. Infants were buried in the roads between villages so that their souls might enter passing women and be born again.

The Feast of the Dead was held at eight-, ten-, or twelve-year intervals. It was a national ceremony at which all of the dead from each Huron town were removed from their temporary graves and brought to a designated place for mass burial.

A SOLEMN SPECTACLE

In preparation for the Feast of the Dead the living Indians of each town and village removed the bodies from their temporary graves. The bones were lovingly stripped of remaining flesh and/or cleaned by relatives and mourners of the deceased. An eyewitness account from the missionary Jean de Brébeuf in 1636 follows:

"I was present at the spectacle, and willingly invited to it all our servants; for I do not think one could see in the world a more vivid picture or more perfect representation of what Man is. For, after having opened the graves, they display—all these corpses—long enough for the spectators to learn—what they will be some day. The flesh of some is quite gone, and there is only parchment on their bones; in other cases, the bodies look as if they had been dried and smoked, and show scarcely any signs of putrefaction; and in still other cases they are still swarming with worms. —finally, after some time they strip them of their flesh, taking off the skin and flesh (by handfuls) which they throw into the fire along with robes and mats in which the bodies were wrapped."

After being stripped of flesh the bones were placed in beaver skin bags or rearticulated and dressed in fine robes and adorned with bracelets and strings of beads. Some bags of bones were arranged to form human effigies that were ornamented with strings of beads and bands of long fur dyed red.

The bodies from each town and village having been prepared, they were then transported on the backs of the villagers to the spot designated for the mass burial. This

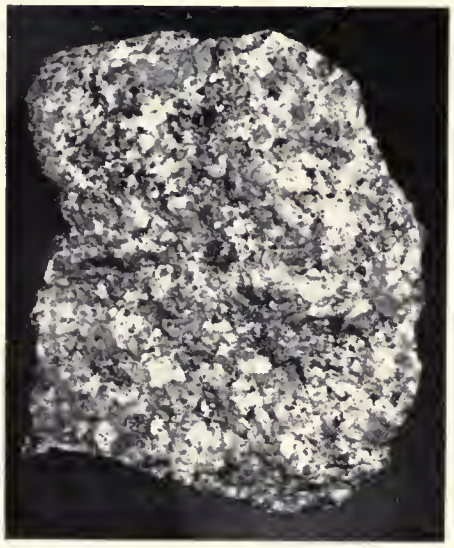
(*Continued on page 6, column 2*)

NAMING A ROCK

By BERTRAM G. WOODLAND
ASSOCIATE CURATOR OF PETROLOGY

EACH WEEK we receive rock specimens to be identified. Some come by mail and others are brought to us by visitors. Not infrequently we are asked what is the actual difference between various rocks and how do we know what names to give them.

First, what is a rock? A rock is an aggregate of one or more minerals, which are the naturally occurring chemical substances which make up the earth's crust. This geological definition of a rock includes not only



GRANITE SPECIMEN
It is composed of feldspar, quartz and biotite.

the solid and hard materials but also loose sands, clays, and volcanic ash. To the civil engineer concerned with constructional materials and foundations, however, a rock is something hard; the soft loose materials are referred to as earth or soil. The choice of name or names given to rocks has been much influenced by their use for certain purposes. For example in the building and monumental stone trade, "granite" is a name used for a wide variety of rock types many of which the geologist would not call granite.

The naming and classifying of rocks are rendered inherently difficult by the very great diversity of types and by the fact that few completely sharp distinctions can be made becuase of the many gradational varieties. However, a classification and an accepted system of naming of rocks are essential for purposes of comparison and descriptions of occurrences throughout the world. Such a system should, apart from just providing a name, ideally provide as much information as possible about the composition, nature, origin and relationships of a rock.

IMPROVEMENT IN CRITERIA

A major difficulty arises when the criteria for separating and naming the rock types are considered. Originally rocks were named and described solely from their appearance to the naked eye or with a simple hand lens, and many of the names are still applied today, although often not in just the same way, as more detailed criteria are now used. About the middle of the last century a great impetus to the systematic detailed description, naming and classification of rocks was provided by the use of the polarizing microscope to examine very thin slices of rock (i.e., thin enough to transmit light). This enabled more accurate determination of the actual mineral species and their relative quantities in a rock to be determined. During the last one hundred years many rocks have been so examined and named and a number of complex scientific classification systems proposed.

At the present time rocks are named and classified on the basis of a number of criteria. Although in part these have a genetic significance, it still has not proved possible to erect an entirely genetic classification, and many of the criteria, for practical reasons, are thus of an arbitrary nature.

As an example of the difficulties involved mention might be made of the three main classes of rocks which are generally accepted and are based on origin. These are: (1) igneous—rocks formed from the cooling of hot molten material (magma) an example of which is volcanic lava; (2) sedimentary—rocks formed from material accumulated by the action of water, wind, glaciers, and gravity, the majority deposited in the sea forming such rocks as limestone and sandstone; (3) metamorphic—rocks which have been produced from pre-existing rocks by the action of heat and/or pressure, usually deep in the earth's crust, an example of which is marble. Now, while it is generally possible to classify

THIN SECTION OF GRANITE
The components are indicated as follows: F—feldspar; Q—quartz; B—biotite; M—magnetite; and A—apatite.

a rock as belonging to one of these classes, by applying certain simple criteria—e.g., sedimentary rocks usually possess well developed and characteristic stratification—it is by no means always so easy, particularly for small specimens brought into the laboratory by a visitor and for which there is no field data, or which may be pebbles found in gravel or the soil. Some metamorphic rocks may have many of the criteria of igneous rocks, particularly if they were derived from the latter or if under ultra-metamorphism the rock mass was so changed as to appear like an igneous rock. Volcanic ash, the product of explosive volcanic eruptions, may be deposited in the sea and be mixed with varying quantities of other sediments so that there may be a complete gradation from a pure volcanic ash to a sedimentary rock.

Geological classifications do not, of course, satisfy the civil engineer, who would wish to see a rock classification using criteria of engineering importance. So far this also has not been possible, but perhaps in time a way may be evolved to relate the purely geological system to one of value to engineers, miners and others concerned with working in or exploiting rocks.

CLASSIFICATION BY GEOLOGISTS

The criteria utilized by geologists are: (1) field occurrence, that is, the way in which the rock occurs in nature; (2) mineralogical composition; (3) the structure and texture of the rock—the way in which the mineral grains are aggregated together, and (4) chemical composition. Of these the most important criteria are texture, structure, and mineralogical composition. Sometimes these can be sufficiently ascertained with a hand lens to give a name to a specimen in the field. However, this is not always possible and the geologist has to be satisfied to use accepted and well understood field names of a broad nature, leaving until later the necessary detailed laboratory work. In the laboratory a binocular microscope, with magnifications up to 40 times, is of great value for determining the grain size, shape and the mineralogic composition of hand specimens. For further

SPECIAL EXHIBITS

The following special exhibits are scheduled for the summer months:

Panorama of the Pacific, through July 15, Stanley Field Hall. This exhibit, which was the feature of Members' Night, May 8, displays selected material from the Fuller Collection of South Seas artifacts.

The Music Makers—Exotic Musical Instruments of the World. Through August 31, Edward E. and Emma B. Ayer Hall (Hall 2).

Indian Art of the Americas, August 1–September 28, Stanley Field Hall. Selected *objets d'art* from the North, Central, and South American collections of this and other leading museums. The exhibit coordinates with Chicago's Festival of the Americas in connection with the Pan American Games.

details recourse must be made to microscopic examination of thin sections.

Thin sections of rocks are prepared by cutting a thin wafer of the sample, usually about one inch square, with a diamond saw. One side of this slice is then ground smooth with abrasive on a rotating lap wheel and the smooth surface is cemented to a glass slide (usually $1\frac{3}{4}'' \times 1''$) with a medium such as Canada balsam, which is liquid when hot, and hard and strongly adhesive when cold. The wafer is then ground thin on lap wheels using successively finer abrasive, and is finished off by rubbing on a glass plate with very fine abrasive until the standard thickness of 3/100 of a millimeter is attained. This thickness is determined by observing the optical properties of some known mineral under the microscope, e.g., quartz. The thin section is then covered with a thin glass cover slip which is also cemented to the slice with Canada balsam. The section is then ready for examination with the petrographic microscope, which is equipped with special apparatus for the observation of the optical properties of minerals. In particular, it has attachments for polarizing the light which passes through the thin section. In this way the optical properties of the mineral composing the rock are determined, and from them the kinds of minerals present, their quantities and arrangement and other data can be obtained. These are then used in the classification of the rock and in determining its origin and history. The polarizing microscope can also be used to examine crushed grains extracted from a rock to determine the identity of a mineral if the preparation of a thin section is not required, or to determine some of the optical data best obtained in this way even if a thin section is available. Most minerals are transparent in thin section but there are many which remain quite opaque, particularly the ore minerals, such as the ores of copper, lead and iron. These are microscopically examined by preparing highly polished surfaces and observing them in reflected light.

CHEMICAL TESTS USED

Chemical methods are often important aids in determining rock composition. Qualitative tests for minerals or elements help in determining mineral species while bulk quantitative analyses are important in comparing the chemical composition of rocks and understanding their modes of origin. It should be emphasized that rocks which have had widely different histories and have different mineralogic composition and different textures may have very similar chemical compositions, so that a chemical analysis alone is insufficient to determine a rock. For some rocks a chemical analysis is necessary to accurately identify and classify it, e.g., volcanic glasses which are devoid of minerals. In addition, other techniques may be brought into service to aid in determining the composition of rocks, e.g., X-ray methods to identify minerals, particularly very fine-grained aggregates such as clays.

However, the polarizing microscope remains the most useful, and essential instrument for the description, naming and classifying and elucidation of the origins of rock types.

There are a number of exhibits in the Museum illustrating the criteria used in the classification of rocks together with examples of some of the types. At the west end of Hall 34 (Physical Geology and Rocks) there are a number of cases concerned with the study of rocks, the common minerals which compose at least 99 per cent of the rocks of the earth's crust, and the classification and naming of the igneous, sedimentary and metamorphic rocks. In Clarence Buckingham Hall (Mineralogy and Meteorites—Hall 35) there is one exhibit showing how physical properties may be used to identify the minerals of a hand specimen.

FEAST OF DEAD—

(*Continued from page 4*)

was a ceremonial journey purposely drawn out over two or three days.

At the place selected for burial there was a large pit 30 to 60 feet square and up to 10 feet deep. At the edge of the pit was a high scaffold or platform. Bodies were hung from poles on this scaffold and bundles of bones were placed on the platform. After lengthy ceremonies and rituals in which the whole Huron nation participated, the bodies were placed in the pit along with beautiful fur robes, pottery, weapons, tools, ornaments, food, and utensils.

Hundreds of people were thus buried and thousands of useful articles were lavished upon the dead. At the end of the Feast of the Dead the souls of the Hurons buried in this way departed from Huronia and went to the various soul villages in the sky.

An appraisal of the Huron feast of the dead is available in the journal of the missionary, Théodat Gabriel Sagard, who witnessed it in 1623 or 1624. He wrote, "Christians, let us reflect a little and see if our fervors for the souls of our relatives—are as great as those of the poor Indians toward the souls of their fellow deceased, and we shall find that their fervors surpass ours, and that they have more love for one another in this life and after death than we, who say we are wiser and are less so in fact—."

Parking Space Expanded

Additional parking space has been made available to Museum visitors. When the free parking facilities at the north end of the building are filled to capacity, cars may be left in the lot at the southeast corner of the building where the Chicago Park District charges a flat fee of 25 cents between 10:30 A.M. and 6 P.M.

MUSIC MAKERS—

(*Continued from page 3*)

by the presence in the exhibit of one, similar in form and use, from the Hopi Indians of Arizona. On the Gulf of Papua a ceremony is performed in which the men of the village mass together and run, shouting, blowing shell trumpets, and whirling bull-roarers. The loud and weird noises they make are intended to indicate to the remainder of the village population, especially the women, that a great and monstrous creature has risen from the sea and has entered the men's clubhouse. Later masked figures emerge from the lodge, giving the impression that a supernatural event has occurred.

The Javanese have developed quite an elaborate type of orchestra to accompany their dances and theatricals. Our exhibit includes a number of the instruments used. One is a type of xylophone played on the same principles as our own similar instrument. It is fancifully carved and has painted animal heads as end decorations. It consists of a set of gongs increasing in size, and in depth of tone, hung in a frame.

In most primitive societies, important events of human life over which the individual has no control—especially birth, puberty, death (all of which are awesome even in a complex civilized society)—are celebrated by religious ceremonies aimed at providing an explanation of the mysteries of life. The most important function of music in these cultures is the observance of these ceremonials. In our society, too, birth and death are still basic themes in music, but our music generally has changed to strictly listening functions rather than the expression of the human experiences to which it relates.

"Fishing" Trips for Children

"Goin' Fishin'" continues as the theme of the Museum Journey for children through July and August. The Journey may be made any day. Children receive instructions at either entrance to the Museum. Those successfully completing this plus three journeys on other topics receive awards as Museum Travelers. After eight Journeys they become qualified for designation as Museum Adventurers, and after twelve as Museum Explorers. After sixteen Journeys a child becomes eligible for a final project and admission to a Museum Club.

Come and See Us Now

A Museum Member recently sent the following note along with a check for membership renewal:

"When I was 10 years old, I took my first visit with our school class. I have never forgotten that memorable trip. All children should make that trip. That first visit is still a wonderful memory of the Museum. I am 70 years old now. Best wishes. . . ."

RESEARCH ON BIRDS, TICKS AND VIRUSES

By MELVIN A. TRAYLOR
ASSISTANT CURATOR OF BIRDS

DURING April and early May I was fortunate in being able to work with Naval Medical Research Unit No. 3 in Cairo, Egypt, as a guest of the Bureau of Medicine and Surgery, U. S. Navy. Among the many endemic diseases being studied at NAMRU 3 are the arthropod-borne viruses. These are the viruses in which the agency that transfers the disease from one vertebrate host to another is an arthropod, usually a mosquito or a tick. Since the vertebrate host is in many cases a bird, this study is naturally of interest to ornithologists. It was in order to help with the collection and identification of possible bird hosts that I was invited to Cairo.

Our knowledge of birds as major hosts of various viruses has mostly been gained since the war. Previously it was believed that most arthropod-borne viruses of medical or veterinary importance were maintained by a direct cycle between man or the domestic animal and the arthropod vector. However, it is now known that in a great many viruses the primary cycle of infection is from bird to arthropod to bird, and it is only during periods of explosive outbreaks that the disease becomes of medical importance. Indeed, from the point of view of the virus, the infection of man is an unfortunate accident since he dies before he can circulate the virus and reinfect other arthropods. Birds, however, are ideal hosts. They are exposed to and attractive to the vector, whether tick or mosquito; they are susceptible to the virus and circulate it in sufficient concentration to infect the arthropod; and as rapid breeders they produce a large number of non-immune individuals each year to perpetuate the disease.

VARIED HOSTS FOR VIRUSES

In this country the viruses which have been demonstrated to have birds as hosts are Eastern and Western Equine and St. Louis encephalitis. The cycle of each of these is similar although varying in the specific hosts involved. The disease shows a rapid growth in late spring and summer when the mosquito population reaches its height. It is at this time that there is a peak population of young, non-immune birds in the nest, and they are readily susceptible to infection from the bites of infected mosquitoes and, in turn, transmit the virus to new mosquitoes. It is at this period of maximum incidence of infection that the disease may spread to man or horses. This active stage lasts but a short time, but the virus is able to pass the winter in hibernating mosquitoes which start the cycle over again the following spring. Similar life histories have been demonstrated for Japanese B encephalitis in Japan and West Nile virus in Egypt. Russian Spring-Summer virus also has a similar cycle, but in this case ticks rather than mosquitoes are the arthropod vector.

Besides the importance of birds as hosts, there is strong indirect evidence that they serve as long-range disseminators of viruses. Eastern Equine encephalitis is found along the east coast of the United States, the gulf coast of Mexico, and the north coast of South America and eastern Brazil. This distribution fits the migration pattern of many birds that breed in the eastern United States, migrate across the Caribbean or along the coast of Mexico and winter in northeastern South America. This agreement in range between the disease and migrant birds certainly suggests that birds have been the main instrument in spreading the virus. The irregular appearance of Murray Valley encephalitis in south Australia is also most easily explained through the agency of migrating birds. This virus is endemic in New Guinea and tropical north Australia, and appears at long intervals in epidemic form in south Australia. It appears to be introduced by migrant water birds who carry it south with them, particularly in years of heavy rainfall.

CARRIED MANY MILES BY BIRDS

Among the tick-borne diseases, a recent explosive outbreak of Russian Spring-Summer virus in the Kyasanur Forest of southern India is strongly suggestive of introduction by migrant birds. This is the first recognized occurrence in a tropical region of this virus, although there is evidence that there was a previous localized infection in Saurashtra a few hundred miles north, and introduction by birds is the only logical explanation of such a long jump from previous areas of infection. The virus was probably carried in infected ticks transported by the birds, rather than in the birds themselves since the latter are infectious for only a short period. There is ample evidence that birds carry ticks for many hundreds of miles during migration. Dr. Harry Hoogstraal, Field Associate of the Museum and medical zoologist at NAMRU 3, has trapped migrant birds from Equatorial Africa carrying larval ticks of species unknown in Egypt, and has succeeded in raising the ticks to maturity. This transportation of ticks explains the occasional presence of small colonies of African ticks in southern Europe and, since an infected tick remains so for life, is an ideal agency for the transmission of viruses.

Although so much has been learned about the life histories and probable dissemination by birds of many viruses, the task still remains of demonstrating the actual transport of the diseases by infected birds or ticks. This must be a co-operative venture involving virologists, entomologists and ornithologists; birds must be trapped in large numbers on migration and identified, blood samples must be taken to determine the presence of antibodies from previous infection or of acute viremia, and the ticks must be collected, identified and tested for infection. Such a program is being initiated this autumn by NAMRU 3 at a station along the north coast of Egypt where migrant birds from Europe arrive in tremendous numbers. Having worked with Harry Hoogstraal for several years, identifying the birds that are his tick hosts, I am naturally looking forward with a great deal of interest to the results of the program this fall. It is certainly to be hoped that enough positive evidence will be obtained of the transportation of viruses by birds to make possible an intensive study of the species involved.

I cannot close without expressing my appreciation for the generous hospitality I received at NAMRU 3. Captain John Seal, MC, USN, commander of the unit, gave me every facility for carrying on my work.

INDIAN ART EXHIBIT COMING IN AUGUST

An exhibit entitled "Indian Art of the Americas" will be on display in Stanley Field Hall from August 1 to September 28. Included will be art objects made during the last 2,500 years, and ranging in origin from Alaska to southern South America. This will be the first major exhibit in the United States to show Indian art of the entire hemisphere.

The exhibit will be one of the features of the Festival of the Americas, which is to be a series of cultural events held in conjunction with the Third Pan American Games. The exhibit will include art objects of first quality from the great Indian collections of Chicago Natural History Museum, and also outstanding material borrowed from eight of the other leading anthropology museums of the United States. An illustrated catalogue is in preparation and will be available to visitors.

Here's Haven for Children During Summer Vacation

Safety—when your children are at the Museum you don't have to worry.

Comfort—when the midsummer heat is sizzling, the Museum is one of the coolest places in Chicago.

The thrills of discovery are experienced in roaming among one of the world's finest assemblages of natural history material.

These are the advantages for children whose parents utilize the facilities of the Museum as a haven for children to visit for hours, or a whole day at a time at intervals during the long school vacation. They were cited by Dr. Clifford C. Gregg, Director, in issuing his annual invitation when Chicago's public schools closed on June 26. With 49 large exhibition halls to cover, children may make frequent visits without exhausting the Museum's potentialities for a lively day.

LIGHTS GIVE MUSEUM NIGHT LUSTER

THE BEAUTY of the architecture of Chicago Natural History Museum's monumental building may now be enjoyed at night. Exterior silhouette-lighting has been installed on all four sides, limning its classic outlines for all who pass by in automobiles or afoot.

The new lights were installed in response to a program for public buildings instituted by Mayor Daley to make Chicago a brighter and more beautiful city. The lights were turned on in full display for the first time on June 16, as the culmination of a dedication ceremony held on the north steps of the Museum. Representatives of the institutions involved threw switches that successively lighted up this building along with the Art Institute of Chicago, the John G. Shedd Aquarium, and the Chicago Park District Administration Building.

The audience at the ceremony was welcomed by Stanley Field, President of the Museum, and Dr. Clifford C. Gregg, Director. William L. McFetridge, Vice President of the Chicago Park District, presided. Other park commissioners, city officials, trustees and executives of all the museums, and representatives of the Chicago Association of Commerce and Industry participated. Music was furnished by the Chicago Civic Chorus under the direction of Dr. William Francis Bergmann.

Work is currently under way to floodlight the Adler Planetarium, and eventually other Chicago structures will be lighted as the program for the beautification of Chicago is expanded. The illumination is expected to rival that which long has gained for Paris the name "City of Light."

The lighting at this time signalizes the opening of Chicago's 1959 gala summer—the summer of the Seaway opening, the visit of Queen Elizabeth, the arrival of a U. S. Navy fleet, the International Trade Fair, the Festival of the Americas, and the Pan American Games. But the program goes far beyond this summer of festivities—it is planned that the lights will be on every night henceforth, in all seasons, and in all the years to come.

SUMMER LECTURE-TOURS GIVEN TWICE DAILY

During July and August, daily lecture-tour service will be expanded to a two-a-day program, mornings as well as afternoons. Although during this period there will be no tours on Saturdays or Sundays, visitors to the Museum will be welcomed during the regular hours, 9 A.M. to 6 P.M.

Except on Thursdays, the morning tours, which begin at 11 o'clock, will be devoted to the exhibits of a single department. All the afternoon tours, given at 2 o'clock, and also the 11 A.M. tour on Thursdays, will be general tours of the outstanding exhibits in all four departments.

Lecturers of the Raymond Foundation staff conduct the tours. Following is the schedule for each week during July and August:

Mondays: 11 A.M.—The Animal Kingdom
2 P.M.—Highlights of the Exhibits

Tuesdays: 11 A.M.—People and Places
2 P.M.—Highlights of the Exhibits

Wednesdays: 11 A.M.—The World of Plants
2 P.M.—Highlights of the Exhibits

Thursdays: 11 A.M. and 2 P.M.—Highlights of the Exhibits

Fridays: 11 A.M.—The Earth's Story
2 P.M.—Highlights of the Exhibits

STAFF NOTES

Philip Hershkovitz, Curator of Mammals, **Dr. Karl F. Koopman,** recently appointed Assistant Curator of Mammals, and **Miss Sophie Andris,** Osteologist, attended the meetings of the American Society of Mammalogists in Washington, D.C. . . . **Loren P. Woods,** Curator of Fishes, was a delegate to the meetings of the American Society of Ichthyologists and Herpetologists in San Diego, California. . . . **Dr. Fritz Haas,** Curator Emeritus of Lower Invertebrates, attended the American Malacalogical Union meetings at Haverford, Pennsylvania. In late July he will begin collecting non-marine mollusks in the Great Smokies Mountains. . . . **Dr. Alan Solem,** Curator of Lower Invertebrates, is on a study tour of museums in San Francisco, Los Angeles, San Diego, Tucson, Denver and Boulder. He is also filling lecture engagements in the west. . . . **George I. Quimby,** Curator of North American Archaeology and Ethnology, recently studied Upper Great Lakes archaeological material in the Museum of Anthropology at Ann Arbor, Michigan. . . . **Allen Liss,** Custodian of Collections—Anthropology, attended the Illinois Archaeological Survey meeting at Springfield. . . . **Mrs. M. Eileen Rocourt,** Associate Librarian, has been elected chairman of the Museum Division, Special Libraries Association.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Botany

From: H. R. Bennett, Chicago—337 phanerogams, Michigan; Dr. Barbara Palser, Chicago—21 specimens of Ericaceae, South Africa

Department of Geology

From: Dr. Raymond Alf, Claremont, Calif.—16 fossil mammals, 2 fossil reptiles, Nebraska; Robert E. Houston, Greenville, Miss.—3 fossil mammals

Department of Zoology

From: Miss Ivete Barbosa, Recife, Brazil—50 inland shells; Rezneat M. Darnell, Milwaukee—collection of non-marine mollusks, Louisiana; W. E. Eigsti, Hastings, Neb.—a bird skin, 19 fleas, 4 ticks, Borneo and Nebraska; Dr. Henry Field, Coconut Grove, Fla.—a species of land shell, South Arabia; Harry Hoogstraal, Cairo, Egypt—55 bird skins; Frank Kovacik, Indian River City, Fla.—a scarab beetle; Prof. Lean-Luc Perret, Cameroons, West Africa—2 frogs; Melvin Traylor, Winnetka, Ill.—37 land shells, Tripoli, Libya

SUMMER ENTERTAINMENTS FOR CHILDREN

The Raymond Foundation will present seven entertainments for children on Thursday mornings during July and August— a stage show, and six programs of motion pictures. The programs will be given in the James Simpson Theatre of the Museum, with two performances of each, the first at 10 A.M., and the second, due to differences in the length of films, with some variations in hour as indicated in schedule below.

No tickets are needed. Children are welcome to come alone, accompanied by parents or other adults, or in organized groups. Following are the dates and titles:

July 2—SPECIAL MAGIC SHOW
(*10 and 11 a.m.*)
A stage production, featuring International Magicians, and clowns

July 9—DAVY CROCKETT
(*10 and 11:45 a.m.*)
The original Disney interpretation of "the King of the Wild Frontier"

July 16—SUMMER EXPLORATION
(*10 and 11 a.m.*)
Exploring the out-of-doors; also a cartoon

July 23—CAMPING IN CANADA
(*10 and 11 a.m.*)
Also: Spirit of Algonquin, and a cartoon

July 30—MYSTERIES OF THE SEA
(*10 and 11 a.m.*)
Coral Wonderlands; also the cartoon folktale, The Fish and Fisherman

August 6—SALUDOS AMIGOS (Special for the Festival of the Americas)
(*10 and 11 a.m.*)
A Disney story of a visit to our Latin American neighbors south of the border; also a cartoon

August 13—DUMBO (repeated in response to many requests)
(*10 and 11:30 a.m.*)
Disney's story of a baby circus elephant

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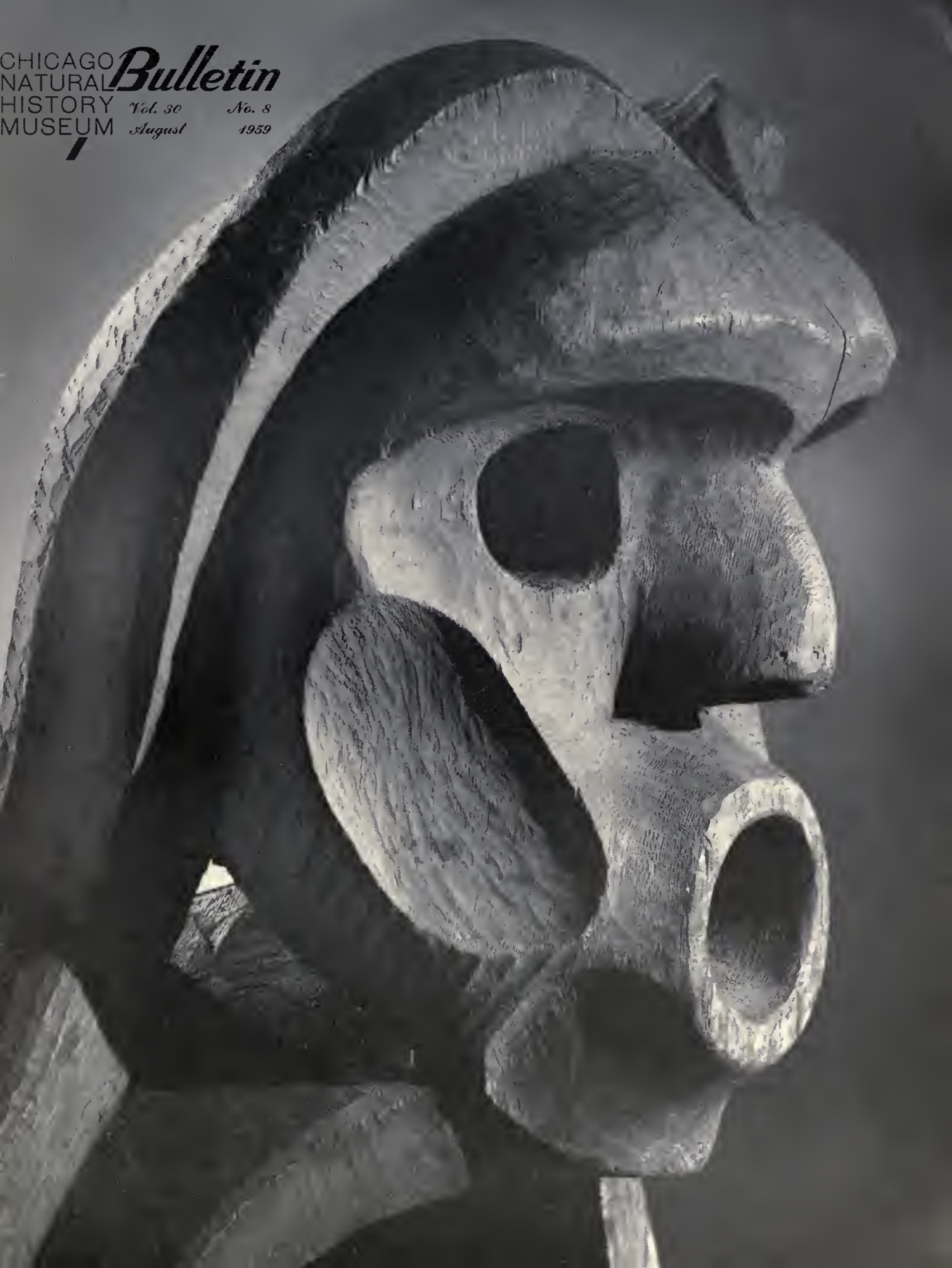

Chicago Natural History Museum

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Members are requested to inform the Museum promptly of changes of address.

MUSEUM ACQUIRES MUSEUM

BY ALAN SOLEM AND
EUGENE S. RICHARDSON, JR.*

NATURAL HISTORY MUSEUMS had their start as cabinets of miscellaneous specimens accumulated by individuals. Some of these private collections formed the nuclei of many of the world's foremost scientific institutions, including the British Museum (Natural History).

The instinct to collect still is present in mankind and, late last year, Chicago Natural History Museum acquired a collection of natural history objects of such vast size that it must be counted a museum in itself. Formed by the late C. D. Nelson, for many years head of a biology department in a Grand Rapids, Michigan, high school, Mr. Nelson devoted most of his later years to the collecting and exchange of natural history objects.

Items such as dried plants, Indian skeletons, turtle shells, pickled crabs, Mexican pottery, stuffed rabbits, metal ingots, and arrowheads were hidden in the mass of fossils, minerals, and shells that comprised the bulk of the material. Over nine tons of specimens in more than 4,000 separate containers were removed from the house, sorted, boxed, and prepared for shipment to the Museum. Seven tons of these specimens occupying about 700 cubic feet of space were retained by the Museum.

The Division of Lower Invertebrates acquired a mass of boxes measuring 8 x 12 x 4½ feet, which probably contains between 250,000 and 300,000 shells. The Division of Fossil Invertebrates has close to 83,000 specimens to sort, label, identify, and catalogue. Fossil plants from this collection comprise perhaps 1,400 specimens, and there is an assortment of more than 4,000 rock and mineral samples.

Mr. Nelson purchased some of this material, and received some in exchanges with fellow hobbyists, but he personally collected a very large portion. A large bureau on his sun-porch, crammed with road maps, notes on collecting localities, and the names of hobbyists in every state of the union attested to his keen interest and future plans for collecting.

Summer vacations were spent traveling and collecting. After his retirement from teaching twelve years ago, his summer avocation was extended throughout the year and included many trips to Florida and the West Coast of the United States. Mention almost any collecting locality in North America famed for its shells, rocks, or fossils, and somewhere in the Nelson collection is a box or two of specimens from that locality.

Large collections of bird and mammal skins had previously been donated by Mr. Nelson to Western Michigan University, and shortly before his death, he presented 66,000 pairs of fresh-water clam shells to Michigan State University. Thus, the seven-ton portion now at Chicago Natural History Museum is only part of the efforts of this amazing hobbyist.

The basis of the shell collection was formed by a Detroit resident, Frederick Stearns, who became interested in shells during a business trip to Japan in 1889. In the next seven years, Stearns managed to accumulate 14,386 *species* of shells (perhaps 150,000 specimens). Early in Nelson's career, he acquired the Stearns collection. Most of these specimens are still in the Nelson collection, in addition to the at least 100,000 shells which Nelson collected personally.

So far, only a few boxes from this collection have been opened, and it will be several years before we can hope to have finished sorting and cataloguing this huge assortment. Every box contains something new to our collection and increases our respect for Nelson's diligence. Unlike most collectors, he was not content with one example, but wanted many specimens to show variation in size, color, age, and sculpture. From a scientist's viewpoint, such series are far more valuable than any single specimen, no matter how beautiful or perfect in size and shape.

Only a few of the 983 boxes of fossils have been unpacked, but particularly impressive are the thousands of Devonian corals, Jurassic plants from Oregon, Devonian invertebrates from New Mexico, and many other specimens from famous localities. Some of these duplicate material already in our collection, but the duplicates can be used to exchange with museums in other parts of the world for material which we lack.

The finest individual specimen, a partial cycad trunk nearly two feet tall, has been gratefully accepted by the Botany Department and earmarked for display in the systematic botany sequence.

Franklin Furnace in New Jersey, Crestmore in California, Bedford in New York, and the Michigan copper district are all names which kindle lights in the eyes of mineral collectors. Nelson visited all of these sites, and more, in the days before amateurs had cleaned out the readily available deposits of beautiful and unusual minerals with which these names are associated. The many, many fluorescent minerals from Franklin Furnace are particularly welcome additions to our Museum.

Besides the nearly 4,000 mineral specimens, there are almost 1,000 rocks, ores, geodes, concretions, and other geological items added to the collections of the Department of Geology.

We live in an age of compartmentalized knowledge, in which most people are masters of one tiny field of knowledge. The amazing Nelson collection is now split up among the four departments of the Museum where it will be studied by members of at least a dozen divisions, and will involve eventually work by at least 20 scientists and their assistants.

In each area of knowledge we can perhaps make more detailed studies than were posble for Mr. Nelson. But there is not one of us who will not be continually amazed that one man could have accomplished so much in so many different fields in one lifetime.

Such breadth of knowledge was characteristic of the early naturalists, but with the vast increase in scientific knowledge it is rarely encountered today. It is indeed a privilege for Chicago Natural History Museum to have acquired the life's work of such an amazing person.

*Dr. Solem is Curator of Lower Invertebrates; Dr. Richardson is Curator of Fossil Invertebrates.

THIS MONTH'S COVER

Our cover shows a detail from a carved wooden feast bowl of the Kwakiutl Indians of Vancouver Island, British Columbia. The bowl, which is 40 inches long, is in the form of a human figure. The part shown here is 12½ inches high. This bowl belonged to a chief, who used it to serve food in a potlatch feast. Its capacity is about five gallons. It is included in the special exhibit of Indian art (see pages 3, 4 and 5).

INDIAN ART OF ENTIRE WESTERN HEMISPHERE IN EXHIBIT

By DONALD COLLIER
CURATOR OF SOUTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

INDIAN ART OF THE AMERICAS, a special exhibit celebrating the Festival of the Americas and the Third Pan American Games, will be on display in Stanley Field Hall from August 1 to September 28. This will be the first major exhibit in this or any other museum in the United States to cover the ancient and recent Indian art of the entire western hemisphere. The objects displayed were selected by the writer; the exhibit was designed by Daniel Brenner, well-known Chicago architect.

The purpose of the exhibit is to present outstanding examples of the major art styles of the last 2,500 years and to demonstrate the richness and variety of Indian art. More than half of the 106 objects in the exhibit were chosen from this Museum's great collection of Indian art. The remainder were generously loaned by the following museums and individuals: The American Museum of Natural History, New York; A. G. Atwater, Chicago; The Brooklyn Museum; Milwaukee Public Museum; Museum of the American Indian, Heye Foundation, New York; The Museum of Primitive Art, New York; the estate of Dr. Matthew Taubenhaus, Chicago; Textile Museum, Washington, D. C.; The University Museum, Philadelphia; United States National Museum (Smithsonian Institution), Washington, D. C.

Examples of pieces in the exhibit are shown on the cover and on pages 4 and 5. A wide variety of mediums is included—stone and ceramic sculpture; carvings in stone, wood, bone, ivory, and shell; ornaments of gold, silver, and bronze; textiles; and featherwork. The ceramic vessels, many of which are in effigy form, are decorated by modeling, carving, incising, and painting. Some of the gold ornaments are cut, hammered and soldered; others are cast by the lost-wax technique.

COLOR AND TEXTURE CONTRASTS

Indian artists often combined several materials in a single sculpture to achieve contrasts of color, texture, and light-reflecting properties. Several examples of this process are included in the exhibit. A Tlingit headdress ornament is carved from wood, inlaid with abalone shell, and overlaid with brass. Both the abalone and the brass give brilliant color contrast and reflect light from various angles. A Peruvian mummy mask of wood is painted, has inlaid eyes of blue and white shell, and is furnished with a woven turban studded with gold bangles and topped by a gold plume. A statue of an Aztec god is carved from lava rock and painted red. The god's heart is represented by a piece of glossy obsidian the size of a hen's egg set into the chest. An Inca llama figurine of silver wears a silver-studded "saddle" blanket inlaid with red pigment and bordered with a crimped ribbon of gold.

Fifteen pictures of Indian art masterpieces will be found on pages 4 and 5.

Included in the exhibit are art objects of such primitive groups as the Eskimos, the Indians of British Columbia, the Crow Indians of Montana, the prehistoric Pueblo Indians, the ancient Hopewell Indians and the Middle Mississippi Indians of the Middle West, and the Indians of the Amazon Basin. The two Hopewell specimens, which are figures of women exquisitely modeled in clay, come from the Knight Mounds in Illinois. The art of such civilized groups as the Mayas and Aztecs of Mexico and the Mochicas and Incas of Peru is well represented, and several rare examples of the indigenous art of the West Indies are shown.

Courtesy U. S. National Museum

Engraving on conch shell, Spiro culture.

Many of the art objects depict religious ideas or were designed to be used in religious rituals or magical practices. For example, the Eskimo mask in the exhibit was worn by a shaman, and the Tlingit salmon-fishing charm, which depicts a bear holding a salmon in its mouth, was placed on stilts in the middle of a river to increase the salmon run. The Crow painted shield, which possessed magical properties, shows a grizzly bear facing a shower of bullets. The design was revealed to the owner in a vision, and as long as he carried the shield in battle he was safe from bullets.

CAT AND SERPENT DEITIES

Much of the art of the civilized societies of Mexico and Peru depicts deities or motifs derived from religious concepts. The two most important beings in the religion and art of these two areas are a feline deity, usually a puma or a jaguar, and a serpent deity, shown as a rattlesnake or the mythical feathered serpent in Mexico, and as other kinds of snakes in the Andes. Both these beings were associated in varying ways with fertility and rain, and sometimes feline and ophidian characteristics were combined in the same deity. The great variety of ways of depicting these two motifs is well illustrated in the exhibit.

In size the objects range from a 14½-foot male figure of wood, which served as a house post of a Salish chief in British Columbia, to a Maya jade head 2½ inches high.

The Pan American countries represented in the exhibit are the United States, Canada, Mexico, Guatemala, Honduras, Costa Rica, Panama, Colombia, Ecuador, Peru, Bolivia, Chile, Argentina, Brazil, Venezuela, Jamaica, Dominican Republic, and Puerto Rico.

A catalogue, *Indian Art of the Americas*, has been prepared to accompany the exhibit and is on sale at the Museum. It includes an introduction to Indian art, descriptions of the pieces in the exhibit, and 68 illustrations.

The exhibit owes much of its interest to the splendid objects loaned by the museums mentioned above. It could not have been brought to completion without the wholehearted co-operation and skillful help of many individuals in various departments and divisions of this Museum.

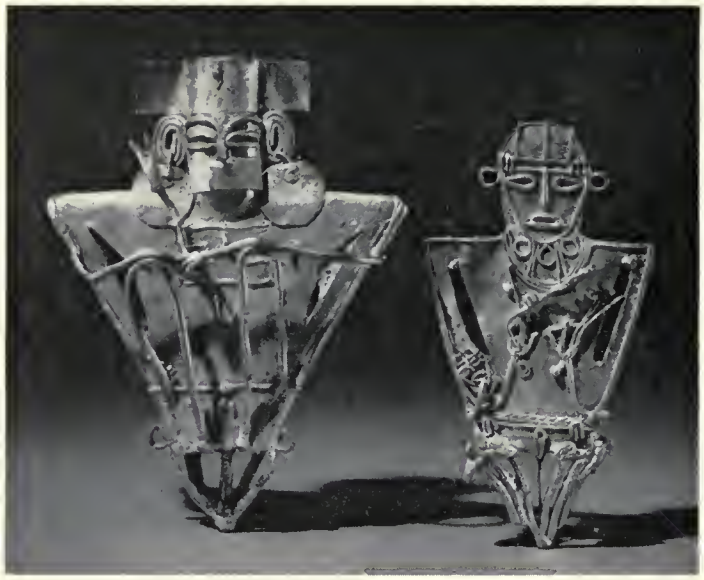
PACIFIC PICTURE BOOK OFFERED FREE

The June issue of the *WFMT Fine Arts Guide*, a monthly magazine devoted to Chicago cultural activities, art features, and the programming of Radio Station WFMT, included a series of photographs of selected specimens from the newly acquired Fuller Collection of Archaeological and Ethnological Materials from the South Seas. Many of the specimens illustrated are included in the Panorama of the Pacific temporary exhibit of the Fuller Collection which has been extended for an additional period of 60 days. It may be viewed in Albert W. Harris Hall (Hall 18) of the Museum, and copies of the *Fine Arts Guide* are available free of charge upon request at the Museum Book Shop.

Whooping Cranes Thriving

The whooping cranes' status improves, according to data from Ottawa, Canada. Thirteen years ago there were only 20 alive; last year there were 31, as follows: 26 wild birds, including four young, and five zoo birds including two young. This year there are at least 34, as follows: 28 wild birds, including two young; and six zoo birds, including one young.

1. Stone rattlesnake, Aztec



2. Chibcha gold figurines, Colombia

3. Hopewell figure

7. Coffin front, Haida, British Columbia

15. Gold pendant

MASTER

SOME of the objects in the
Immediately to the left (N
chihuilicue, goddess of runnin
The Hopewell clay figurine (No
jaguar form (No. 13) from Peru

The objects illustrated are
of Nos. 3, 6 and 13, which ar
Natural History, New York, ar
6 and 13, courtesy American Museum and Universi
illustrated catalogue of the exhibition is available

9. Painted shield, Crow, Montana

10. Aztec figure

11. Haida carving

12. Mochica vase,

4. Aztec goddess, stone

5. Kwakiutl mask, British Columbia

6. Negative-painted jar, Recuay, Peru

IECES OF INDIAN ART

rent exhibit "Indian Art of the Americas" are shown on these pages. 5) is a Tolima style pendant of gold from Colombia. No. 4 shows Chal- ıter. The gold figures shown in No. 2 were cast by the lost-wax process. was found in Illinois and dates from about 200 B.C. The stone bowl in tes from about 800 B.C.

the collection of Chicago Natural History Museum, with the exception spectively from Milwaukee Public Museum, the American Museum of he University Museum, Philadelphia. The photographs (except photos Iuseum) were made in the Museum's Division of Photography. A fully $1.00 postpaid.

8. Chibcha figure, Colombia

13. Stone jaguar bowl, Chavin, Peru

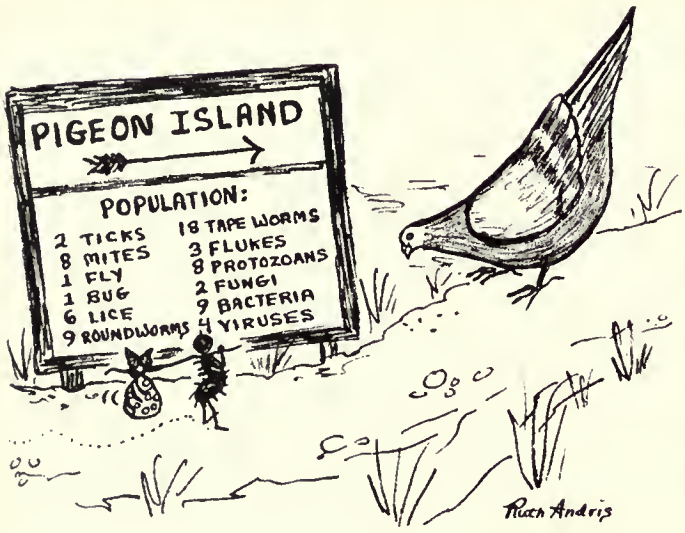
14. Chimu vase, Peru

PITY POOR PIGEON: HOST TO A COMMUNITY

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

A PIGEON flying by may seem to be all alone, but the chances are it is really a whole community. The bird is like an island with its own flora and fauna, carrying at least some of the 70 or so plants and animals that have been recorded as living on or in the domestic pigeon. These include two species of ticks, eight of mites, a fly, a bug, six lice, nine roundworms, eighteen tape worms, three flukes, eight protozoans, two fungi, nine bacteria, four viruses, and doubtlessly many others.

Ignoring the smallest microscopic animals and plants, the number of individuals of some of the larger animals (the flies and ticks may be as large as a housefly, and the tapeworms several feet long) are impressive. A thousand tapeworms have been found in the intestines of a single pigeon, 30 pigeon flies among the feathers of a single bird, and 20 bird lice on a single feather.



Just as the animals on an island divide the living space among themselves (birds in the trees, rabbits on the ground, moles burrowing, and fish in the streams), so do the animals and plants on the pigeon divide the living space. Among the feathers are flies and lice; on the skin, ticks and mites; burrowing into and under the skin, mites; under the eyelids, roundworms (eye worms); in air passages, mites, roundworms, and fungi; in the intestines, tapeworms, roundworms, protozoans and bacteria; in the blood stream, roundworms (filaria), protozoans and viruses; in the tissues, roundworms; and in the brain, viruses.

Even with animals living among the feathers on birds, some occupy special habitats. Some broad, round lice live on body feathers; some longer, more slender ones prefer the head or wings; some mites prefer to live on the quills, and some very small lice and mites seem to prefer to drill a hole in the shaft and live inside it. Some roundworm members of a bird community do not live out their life span in the same part of the bird. Their peregrinations are probably something like this: the egg, swallowed by the bird, hatches in the intestine where the adult life of the worm is spent. However, it first spends ten days traveling. First penetrating the wall of the intestine, the young worm is caught up in the bloodstream and swept into the liver, thence to the lungs and heart. Finally it burrows from the lungs to the windpipe and finally to the gullet, whence the route is prosaic, via the alimentary tract to its adult habitat, the intestines.

The food of the different members of this community is as various as their form. Flies and ticks, some mites, and some lice may suck blood; some lice may eat downy parts of feathers; some mites, living inside quills, may feed on the pith found there, others may eat scurf and skin debris; worms in the intestines lie in a bath of partly digested bird food and absorb it through their body wall; some roundworms (filaria) and protozoans may feed on the blood.

Probably all birds support sizable communities of other animals, and of course there is the question of how they arrive on the "bird island." Some, like lice, undoubtedly are handed down by parent to offspring when the adults are brooding, through contact. The antiquity of some of these heirlooms may be judged by the fact that a species of louse may be found on only one species of bird. The passenger pigeon, for example, had an endemic louse, and when the last passenger pigeon died, the last of this species of louse died with it.

There are also strange and complicated life histories tied up with colonizing. Some roundworms simply lay great numbers of eggs, as many as 12,000 a day, and depend on a few of them being swallowed by the right kind of bird. But with some flukes, the life cycle is very complicated. Male and female organs may be present in the same individual and self-fertilization is the rule, thus avoiding the necessity of two animals finding each other in the dark labyrinth of the bird's insides where they live. The eggs, passed out by the bird, in some species may be eaten by a snail where the young passes part of its life. Then the snail may be eaten by a fish, where the fluke passes more of its life, and finally the fish is eaten by a bird, in whose body the worms pass their adult life.

Yet other animals, like the one-celled animals that cause malaria, some roundworms (filaria), and some viruses, are carried by such vehicles as mosquitoes, which receive them when they bite one bird, and pass them on accidentally to the next bird they bite.

This of course brings our pigeon back into perspective. As the filaria in the blood stream is a tiny unit in the bird-island-community, so the pigeon is a small unit in a larger community. In this community it eats seeds, gives pleasure to some people who like to feed peanuts to pigeons on elevated railway stations; adds to the supply of poultry on the market; is the main actor in pigeon racing; is the main food of duck hawks wintering in cities; and in the Egyptian Delta is one of the reservoirs of the virus which causes "West Nile Fever."

Such communities as that outlined for a pigeon of a city street are not restricted to birds, of course. Mammals, fish, snails and worms all may have other, smaller animals living on or in them. Each animal is a community in itself. Even the pigeon fly may have a mite on it, and the mite in its turn may carry bacteria.

An ideal, balanced community would exist happily, each species not interfering unduly with other species, though individuals must continually go to the wall. A pendulum, however, is a better comparison than a balance when thinking of populations; and even then, if you take the long view, there are always species that lose out, no matter if they are as big as dinosaurs or have teeth as long as a sabre-toothed tiger. There is always something getting out of balance. Often it has to do with a new invasion of an animal or plant, as the chestnut blight from Asia that wiped out the American chestnut; the rabbits introduced on Laysan Island that disrupted the whole community of nesting birds by eating up all the vegetation; the African giant snail in the Pacific islands; and the blood-destroying protozoan in Brazil which caused a malaria outbreak that killed thousands of people when certain mosquitoes were introduced from Africa.

Such widespread devastation by one animal or plant "kills the goose that lays the golden egg" for the invader finally suffers from food shortage. That natural checks and controls may develop is nowhere better illustrated than by the Australian cottony cushion scale insect which, introduced into California about 1868, threatened the citrus industry, but was brought under control by introducing its counter-pest, an Australian ladybird beetle.

Such intricacies are fascinating studies, showing the interdependence of living things. But no one biologist can be expected to know how to classify and name all these diverse organisms—which is preliminary to talking about them—let alone have the time to work out all their life histories. Thus the studies are co-operative and piecemeal. The bird

specialist sends the lice from a bird to a louse specialist; the specialist in ticks sends the birds from which his ticks came to an ornithologist for identification. With the recognition of the role that some of the units of these communities play in spreading and causing human disease, public health and tropical medicine units have devoted much time of many people to studying these problems, but these people, too, depend on the work of museum specialists, or develop their own specialists to work with series of reference specimens, in effect museum-type collections.

The personnel of Chicago Natural History Museum have not only studied the classification of many animals, great and small, in which they are specialists, but have also helped specialists in other groups and have been helped by them. They have also studied the relations of some animals to their environment, whether it be the trees and the weather, neighbors of similar size and habits, or host-parasite relationships.

Museum scientists have participated in many unusual activities. They have described a new lizard from the stomach of an African goshawk; described how cows help a Central American cuckoo catch grasshoppers; and evaluated the relationship of flamingoes in view of their lice being more like those of geese and ducks, rather than those of storks and herons. They have also advised on bats' share in the recent cases of rabies in the United States; commented on why birds wipe ants on their feathers; and helped with the demonstration that colonization of African ticks in Europe may be brought about by the agency of migrating birds. With a student of viruses they have discussed how a recently discovered Indian virus, which affects men and monkeys, occurs in birds, and is transferred by ticks, may have been introduced into India from Russian points to the north by migrating birds, either in their bloodstream or in ticks they carried.

Books

SEA TREASURE. A Gulde to Shell Collecting. By Kathleen Yerger Johnstone. Houghton Mifflin Co., 1957. 247 pages. 8 color plates, numerous line drawings. $4.

Nearly every person who visits the seashore picks up a few shells on the beach and brings them home as vacation mementos. Usually the interest is fleeting and the beach-worn shells or curio-shop souvenirs gather dust on the mantle or are buried in a small box 'way back in an overcrowded attic. Yet the beautiful forms, colors, and intricate ornamentation of seashells sometimes kindle a curiosity that rapidly grows into a desire to have more and more kinds, bigger and better specimens, and rare species that "Mr. Jones" doesn't have. Many people are bitten by the "shell bug." Some pass beyond the "stamp-collecting" stage and through their interest in the shell as part of a living organism become very competent amateur naturalists. If infected early enough, professional biologists may even result from "shell fever" (the author of this review is an example).

The gaps between the levels of interest are large and bridged but slowly. Recent years have produced a revival of interest in shell-collecting as a hobby, and many excellent books have been published that aid the collector in identifying his specimens. For the person with some background information and a definite interest, these books offer excellent summaries of the common species and are often instrumental in converting an admirer of beautiful shells into a serious amateur student of mollusks.

The biggest gap, and the hardest one to cross, is that between the first flicker of interest and the first attempt to make a collection of shells. The identification manuals, with their imposing scientific names and pictures of a bewildering variety of shells, are confusing to the novice and may even discourage a potential hobbyist. There has long been a great need for an introduction to shell-collecting that attempts to explain general principles and provides guidance for the person with an interest but no knowledge. *Sea Treasure* does this more than adequately. Written in a very simple style, it can be understood by an intelligent nine- or ten-year-old; yet it offers enough information to be of value to the new conchologist of sixty-five. Few books are at all comparable. R. Tucker Abbott's *Introducing Sea Shells* is aimed at a higher level of interest and might serve as the next step for a budding conchologist. The only other general introduction, A. Hyatt Verrill's *Handbook for Shell Collectors*, contains many inaccuracies and is not recommended.

Besides the expected summaries on how and where to collect shells and the mechanics of housing, cleaning, and identifying a shell collection, *Sea Treasure* adds several very useful features.

From the viewpoint of a scientist, three items are extremely welcome. The emphasis on the shell as *part* of a living animal (Chapters 5 and 6) is a long overdue subject for consideration in popular books on shells. Few people realize that conservation of good localities is as important to other shell collectors as the fish-and-game laws are to sportsmen (Chapter 10, "Don't be a Pig"). And the advice on the care and handling of museums by the amateur (pp. 109–111) may help alleviate one of our biggest headaches as professional malacologists.

Sea Treasure is not an identification manual, and the illustrations were chosen to show unusual or particularly beautiful shells, thus serving to lure the reader further. The black-and-white drawings are excellent, but the many color-figures suffer from an "artistic" treatment. While generally accurate, the intensified coloration and surface "sheen" of the pictures may make the actual specimens seem dull and unattractive by comparison.

For the person who knows nothing about shells and wishes to learn, *Sea Treasure* is unhesitatingly recommended. As a museum scientist who receives many requests for general information on how to collect shells, I welcome *Sea Treasure* as a useful and accurate aid to help answer these questions.

ALAN SOLEM
Curator, Lower Invertebrates

SPECIAL EXHIBITS

The following special exhibits are scheduled for the summer months:

Panorama of the Pacific, through August 31, Albert W. Harris Hall (Hall 18). Selected material from the Fuller Collection of South Seas artifacts.

The Music Makers—Exotic Musical Instruments of the World. Through August 31, Edward E. and Emma B. Ayer Hall (Hall 2).

Indian Art of the Americas, August 1–September 28, Stanley Field Hall. Selected art objects from the North, Central, and South American collections of this and other leading museums. The exhibit coordinates with Chicago's Festival of the Americas in connection with the Pan American Games.

Technical Publications

The following technical publications were issued recently by the Museum:

Fieldiana: Zoology, Vol. 36, No. 4. *Catalogue of Type Specimens of Reptiles and Amphibians in Chicago Natural History Museum.* By Hymen Marx. 90 pages. $1.25.

Fieldiana: Anthropology, Vol. 36, No. 8. *The Old Copper Culture and the Keweenaw Waterway.* By George I. Quimby and Albert C. Spaulding. 13 pages, 7 illustrations. 40c.

Fieldiana: Anthropology, Vol. 36, No. 9. *Lizard Hunts on the North Coast of Peru.* By Allan R. Holmberg. 18 pages, 15 illustrations. 75c.

Fieldiana: Botany, Vol. 29, No. 4. *Monograph of the Genus Russella (Scrophulariaceae).* By Margery C. Carlson. 70 pages, 7 illustrations, 3 maps. $1.50.

Fieldiana: Zoology, Vol. 39, No. 11. *The Races of the Shrike Lanius validirostris.* By Austin L. Rand and D. S. Rabor. 2 pages. 10c.

TWO MORE MOVIES FOR CHILDREN

The two final programs in the Raymond Foundation's summer series of free movie programs will be given on the mornings of the first two Thursdays in August. The shows are presented in the James Simpson Theatre of the Museum, and two performances of each are offered. No tickets are needed. Children are welcome to come alone, accompanied by parents or other adults, or in organized groups.

The remaining dates and titles are:

August 6—SALUDOS AMIGOS (Special for the Festival of the Americas)

(10 and 11 a.m.)

A Disney story of a visit to our Latin American neighbors south of the border; also a cartoon

August 13—DUMBO (repeated in response to many requests)

(10 and 11:30 a.m.)

Disney's story of a baby circus elephant

Children's "Fishing" to End

August is the last month of "Goin' Fishin'," the summer Museum Journey for children. The Journey may be made any day. Instructions are given to participating children at either Museum entrance.

Beginning September 1, and continuing through November 30, a new Journey, "Giant Plants," will be offered. Details will appear in the next BULLETIN.

Children successfully completing four Journeys on different subjects are designated Museum Travelers. After eight Journeys they receive awards as Museum Adventurers; after twelve they become Museum Explorers. After sixteen Journeys they become eligible for a final project and admission to a Museum Club.

Staff Notes

William D. Turnbull, Assistant Curator of Fossil Mammals, and **Ronald J. Lambert**, Preparator of Fossils, have completed their season's paleontological field work in Washakie Basin, Wyoming, and returned with their fossil collections. . . . **Mrs. Meta P. Howell**, Librarian, attended the recent meetings of the American Library Association in Washington, D. C. . . . **Dr. Roland W. Force**, Curator of Oceanic Archaeology and Ethnology, attended a meeting in New York last month of the Subcommittee on Man preparing for the Century 21 Exposition to be held in Seattle in 1961. Dr. Force also made study visits to the American Museum of Natural History, New York, the Brooklyn Museum, and the Peabody Museum in Salem, Massachusetts.

Save Elms, Lose Birds

The summer robin population on the Michigan State University's North Campus, East Lansing, decreased from 185 pairs in 1954, to three adults in 1958, due to intensive spraying to control elm bark beetles and to control mosquitos. The poison is accumulative, according to Prof. G. J. Wallace.

Audubon Magazine, Jan.-Feb., 1959

NEW MEMBERS

(June 16 to July 16)

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SUMMER LECTURE-TOURS GIVEN TWICE DAILY

During August, daily lecture-tour service will be continued on a two-a-day schedule, mornings as well as afternoons, as in July. Although during this period there will be no tours on Saturdays or Sundays, visitors to the Museum will be welcomed during the regular hours, 9 A.M. to 6 P.M.

Except on Thursdays, the morning tours, which begin at 11 o'clock, will be devoted to the exhibits of a single department. All the afternoon tours, given at 2 o'clock, and also the 11 A.M. tour on Thursdays, will be general tours of the outstanding exhibits in all four departments.

Lecturers of the Raymond Foundation staff conduct the tours. Following is the schedule for each week during August:

Mondays: 11 A.M.—The Animal Kingdom
2 P.M.—Highlights of the Exhibits

Tuesdays: 11 A.M.—People and Places
2 P.M.—Highlights of the Exhibits

Wednesdays: 11 A.M.—The World of Plants
2 P.M.—Highlights of the Exhibits

Thursdays: 11 A.M. and 2 P.M.—Highlights of the Exhibits

Fridays: 11 A.M.—The Earth's Story
2 P.M.—Highlights of the Exhibits

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Botany

From: Dr. E. E. Sherff, Hastings, Mich.—35 phanerogams, Hawaii; C. A. Sylvester, Evanston, Ill.—81 phanerogams

Department of Geology

From: Dr. Eigel Nielsen, Copenhagen, Denmark—cast of Eocene turtle skull

Department of Zoology

From: Miss Peggy Blake, Evanston, Ill.—a bird skin; British Museum (Natural History), London—219 reprints of publications on mammals; Norman R. French, Idaho Falls, Ida.—7 bird skins, a marmoset, Ecudaor; C. E. Hoger, St. Louis—6 land shells, Illinois; Harry Hoogstraal, Cairo, Egypt—107 mammals, a frog, 33 lizards, 52 snakes; Karl Plath, Oak Park, Ill.—a bird skin, Philippines; Scripps Institution, La Jolla, Calif.—71 fish specimens, Mexico; Dr. Fritz Zumpt, Johannesburg, South Africa—4 mammal skins, a mammal skull, Mozambique and Southwest Africa

Visitors deeply interested in subjects covered by Museum exhibits are welcome to seek further information by consulting books in the Museum's reference library where 135,000 volumes, one of the largest collections in the specialized fields of natural history, are available.

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Bulletin

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THE BULLETIN

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Members are requested to inform the Museum promptly of changes of address.

RECEPTION AT MUSEUM OPENS AMERICAS FESTIVAL

The opening on July 30 of the special exhibit, Indian Art of the Americas, in Stanley Field Hall, at a preview for Members of the Museum and other invited guests, proved to be one of the liveliest and most successful evening events ever staged in the Museum.

It was not only a Museum event, but the official inaugural of Chicago's Festival of the Americas for cultural exchanges between all the nations of the western hemisphere in the fields of painting, sculpture, music, ballet and drama—a prelude to the Pan American Games.

Preceding the preview of the Museum exhibit, the Women's Committee for the Pan American Games entertained some 400 guests at a gala international dinner party in the dining rooms of the Museum. Present were Chicago civic, artistic, and business leaders, and the consular corps not only of Pan American countries but also the representatives of nations of Europe, Asia, Africa and elsewhere. A message from President Eisenhower to the assemblage was read by Mayor Daley. The dinner was followed by a reception in Stanley Field Hall. The Mayor and Mrs. Daley headed the reception line of distinguished persons.

At the same time the Museum was host to its membership, who participated in the preview of the exhibit and were served refreshments. In all, 1,387 persons attended the evening's festivities.

Through the courtesy of Mrs. J. Dennis Freund, a concert of chamber music was performed in the James Simpson Theatre by members of the Grant Park Symphony Orchestra, with Thor Johnson conducting. Highlight of the program was the world premiere of a new composition with an American Indian motif, the Concerto for Oboe and Strings, Opus 87, by Dr. Jack Frederick Kilpatrick, authority on American Indian Music.

The 50 or more members of the Women's Committee whose planning, hard work, and sharing of expenses contributed tremendously to the success of the event co-ordinated their efforts through Mrs. Frederick W. Specht, chairman, Mrs. O. A. Jackson and Mrs. A. D. Plamondon, Jr., co-chairmen. The responsibilities for the myriad chores connected with the occasion were divided between several subcommittees.

Indian Art of the Americas will remain on exhibition in Stanley Field Hall through October 28. The first major exhibit in the United States to cover ancient and recent Indian art of the entire western hemisphere, its time scope is the last 2,500 years, and its geographic scope from Alaska to southern South America. A detailed description by Dr. Donald Collier, Curator of South American Archaeology and Ethnology, together with a two-page layout of pictures appeared in the August BULLETIN. Copies of an illustrated catalogue compiled by Dr. Collier are still available from the Museum at $1 postpaid.

STAFF NOTES

Albert W. Forslev, Associate Curator of Mineralogy, will leave early in September on a mineral collecting expedition to the copper mining districts of New Mexico and Arizona, and the borax deposit of the Death Valley region of California. . . . **Dr. Robert H. Denison,** Curator of Fossil Fishes, and **Orville L. Gilpin,** Chief Preparator of Fossils, are collecting Devonian fish specimens in Wyoming, Idaho, and the Canadian province of Alberta. . . . **Dr. John Thieret,** Curator of Economic Botany, is engaged in field work in the Great Slave Lake and far northern Great Plains regions of Canada. . . . **Dr. Theodore Just,** Chief Curator of Botany, attended the 9th International Botanical Congress in Montreal last month. He presented a paper on *Cycadaceae* at a meeting of the Paleobotanical Section. . . . **George I. Quimby,** Curator of North American Archaeology and Ethnology, has been elected a Fellow of the American Association for the Advancement of Science. . . . **Dr. Donald Collier,** Curator of South American Archaeology and Ethnology, participated as a member of a panel discussion of the Festival of the Americas on "The American Scene" television program over Station WNBQ (Channel 5) on August 16. He gave a commentary on the current special exhibit, "Indian Art of the Americas," and showed illustrative material. . . . **D. Dwight Davis,** Curator of Vertebrate Anatomy, recently lectured on his Malayan exploration for members of the Kennicott Club.

THIS MONTH'S COVER

Shown on our cover is a view of part of a new diorama recently installed in Hall 8. The scene is the Great Market in the Aztec capital, now Mexico City, shortly before the arrival of Cortez. In the foreground are seen fresh fish being unloaded from a dugout canoe, and the fruit and vegetable section. Farther back are jars of honey, sacks of ground chocolate, and live turkeys and dogs. Behind the market is the great pyramid of Tlatelolco, and a snow-covered volcano is seen in the distance. Further details are given on page 3.

JOHN P. WILSON

1877–1959

With deep regret, the Museum learned of the death at Charlevoix, Michigan, on July 26 of John P. Wilson, a Trustee of the Museum. Mr. Wilson was elected to the Board of Trustees in 1932, and since 1933 had served as a member both of the Finance Committee and the Executive Committee.

John P. Wilson

Mr. Wilson was an outstanding Chicagoan. He was senior partner of Wilson and McIlvaine, attorneys, and had served as a director of Marshall Field and Company, International Harvester Company, The First National Bank of Chicago, The United States Trust Company of New York, and the General Electric Company. He gave generously of his time and money for the benefit of others, and served as a member of the Board of Trustees of the University of Chicago, the Children's Memorial Hospital, and the Newberry Library.

His wise counsel and outstanding service to the Museum over a period of more than a quarter of a century are deeply appreciated. He will be greatly missed.

NEW AZTEC DIORAMA COMPLETES MESOAMERICAN HALL

By DONALD COLLIER
CURATOR OF SOUTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

THE REINSTALLATION of Hall 8 (Ancient and Modern Indians of Mexico and Central America) was completed recently with the opening of a diorama showing Aztec life. The scene is the Great Market at Tlatelolco in A.D. 1515, nearly five years before the arrival of Cortez. Tlatelolco and Tenochtitlan were twin cities forming the Aztec capital, which today is Mexico City, the capital of Mexico.

WATERWAYS IMPORTANT THEN, TOO
Dugout canoes landing at this canal terminal have brought fresh fish and dry goods direct to market.

The Aztec market exhibit was created by Dioramist Alfred Lee Rowell. It is one of the most elaborate, beautiful, and informative of the remarkable series of dioramas depicting Indian life that Mr. Rowell has constructed for the Museum during the past eighteen years. The series includes ten dioramas dealing with Indian groups in the United States, two with the Mayas, one with the Aztecs, and one with the Incas of Peru.

As we approach the Aztec diorama we see a great square thronged with people and crowded with merchandise. The market is bordered on three sides by covered galleries supported by columns ("arcades") in which vendors and artisans have their stalls. In the background is the great pyramid of Tlatelolco with its twin temples, and far away rises the eastern range of mountains dominated by the snow-capped volcanoes, Ixtaccíhuatl and Popocatépetl.

WOMEN FIGHT FOR BARGAINS

To our right in the market is the cotton cloth and clothing section. On display are women's skirts and blouses (huipils), men's mantles, cloth, raw cotton, hanks of dyed thread, and a feather blanket. Two women are struggling for possession of an embroidered blouse (*see illustration*) as at a bargain sale in a modern department store.

Nearer the center of the plaza is the head of a canal at the edge of which two dugout canoes are unloading dry goods and fresh fish (*illustration*). Tenochtitlan-Tlatelolco is an island city in Lake Texcoco, connected with the mainland by three stone causeways. An aqueduct brings fresh water from the distant shore, for the lake water is brackish. The city is cut by many canals which are spanned by wooden drawbridges. The lake serves not only as a means of defense of the city but also as a waterway for thousands of canoes carrying food and produce and raw materials to the city, to return with cargoes of merchandise.

To the left of the canal is the fruit and vegetable section (*illustration*). We see corn, squash, beans, tomatoes, peppers, sweet potatoes, avocados, and pineapples. Some of these have been brought from the warmer, lower country to the south and east of the Valley of Mexico.

Farther to the left are the pottery section (*illustration*) and the flower stalls. We see great stacks of water jars, cooking pots, bowls and plates, grater bowls with tripod legs for grinding chile, braziers, and finely painted and burnished bowls and vases.

FLOWERS IN PROFUSION

The Aztecs were very fond of flowers, which they used in everyday life and for ceremonial purposes. They cultivated tuberoses, dahlias, marigolds, cosmos, and zinnias. We see many of these in the market, and customers are carrying flowers along with their other purchases.

Farther back in the market we see for sale ground chocolate, turkeys, fattened dogs raised especially for eating, grinding stones for mealing corn, cordage and rope of maguey fiber, wood and wood products, stone images of the corn goddess to be used in household shrines, flake knives of obsidian being made on the spot, dyes and pigments, feathers—and even slaves. A barber is cutting a customer's hair with a razor-sharp obsidian knife. Freshly baked tortillas are available for the hungry shoppers.

These are some of the things we see in the Great Market. Our limited space prevents enumerating all of the merchandise available or describing all the kinds of distinctively dressed people who make up the throng—the porters, boatmen and artisans, the vendors and merchants, the housewives and children, the military men, the market officials and juvenile officers. To paraphrase Bernal Diaz, who visited the Tlatelolco market with Cortez and Montezuma on a November day in 1519, we wish we could tell of all the things that are sold in the market, but they are so numerous and of such different quality, and the market place with its surrounding arcades is so crowded with people that one would not be able to tell about it all in two days.

TURMOIL IN CLOTHING DEPARTMENT
Determined women fight it out over an embroidered blouse while the distressed merchant looks on.

The sources of information on which the Aztec diorama is based are of considerable interest. Of primary importance were three documents: *The True History of the Conquest of New Spain* by Bernal Diaz del Castillo; *The Five Letters* of Hernando Cortez; and the *Codex Mendoza*. Diaz's eyewitness account of the conquest of Mexico contains a vivid description of the Great Market at Tlatelolco. A fine copy of the first edition of this book (Madrid, 1632), opened to the pages describing the market, is on display at Newberry Library as part of the exhibit on early books relating to Pan American history. Cortez's letters, which were written to

Exhibit of Indian Art Extended to Oct. 28

The special exhibit, Indian Art of the Americas, originally scheduled to end September 28, has been extended to October 28. Included in the show, located in Stanley Field Hall, are selected art objects from the North, Central and South American collections of this and other leading museums. The material represents some 2,500 years of creative effort.

Charles V, King of Spain and Holy Roman Emperor, between 1519 and 1526, are an account of the conquest and a record of his observations of the life and customs of the Mexicans. They constitute one of the most remarkable documents of the Period of Discovery.

POTTERY FOR SALE

Although decorated for eye appeal, this pottery was made for utilitarian purposes primarily. Much of it has been preserved to the present day, providing archaeological data and treasures for museums and art collectors.

The *Codex Mendoza*, a document assembled shortly after the Spanish Conquest, contains a pictographic account of Aztec history; Montezuma's Tribute Roll; and a general account of Aztec customs illustrated by native artists. This codex was Mr. Rowell's most useful source of information on costumes and accessories and hairdress, on the appearance of many of the items of merchandise in the market, and on the character and appearance of the military and civilian officials. He mastered the difficult 16th century handwriting in which the explanations in the codex are recorded—with the flourishes, inconsistencies of spelling, omissions and abbreviations—and became a true authority on the kinds and quality of tribute accorded Montezuma by all the hundreds of towns under Aztec domination.

Other useful sources were Bernardino de Sahagun's *Historia General de las Cosas de Nueva España*, and the illustrations for this work, done by Aztec artists, called the *Codex Florentino*. Archaeological studies and interpretations of Aztec culture were indispensable.

The Museum's excellent Aztec collection, which is displayed in cases flanking the diorama, furnished models for many of the artifacts shown in the market scene. Data on fish and cultivated plants came from books and the collections of the Departments of Zoology and Botany. Helpful advice was received from Dr. Alfonso Caso, distinguished Mexican archaeologist, and J. Eric S. Thompson, Museum Research Associate in Central American Archaeology.

These are the sources from which Mr. Rowell drew his understanding of Aztec life and commerce. The details of the market are as authentic as painstaking study and imaginative insight can make them. To this accuracy of detail he has added that indefinable artistic ingredient which renders the diorama both alive and believable. We see not a clever collection of archaeological details but a scene of lively human activity, the very epitome of Aztec daily life. The reader will have to see for himself the humorous scenes, the squabbling, the crises, the bartering, and the gossiping, all being enacted within the teeming market throng at Tlatelolco.

It is fitting that the new Mesoamerican hall should be completed in time for the Festival of the Americas and the Third Pan American Games now being held in Chicago. There are exhibits of archaeological and ethnological material from Panama, Costa Rica,

BUSY FOOD SECTION

Fruit and vegetables are heaped in front of a woman making tortillas on a charcoal brazier.

Nicaragua, El Salvador, Honduras, British Honduras, Guatemala, and Mexico. The completeness of the Mexican archaeological exhibits and the high quality of the objects shown are due in part to the extensive exchange carried out with the National Museum of Mexico in 1950. The exhibits in Hall 8 form a rich and varied complement to the works of art in the special exhibit "Indian Art of the Americas," which will be on display in Stanley Field Hall until October 28.

Russian Arts Group on Visit

A group of sixteen distinguished Russian artists, actors, writers, musicians, and educators visited the Museum briefly on August 17. Included were Pavel Markov, Director of the Moscow Art Theatre; Vladimir Kandelski, Director of the Stanislavsky Music Theatre, and Evan Martynov, musicologist and critic for *Pravda*. The group was sponsored by the International Cultural Exchange Service of the American National Theatre and Academy. Mrs. Lydia Kislova, representing Supreme Soviet Praesidium–American Cultural Relationship, was group leader and principal interpreter. Dr. Donald Collier, Curator of South American Archaeology and Ethnology, and John R. Millar, Deputy Director, were hosts and guides.

GEM WITH QUALITIES OF A CHAMELEON

By HARRY CHANGNON
CURATOR OF EXHIBITS—GEOLOGY

AMONG the vagaries of nature none pleases milady more than the chameleon-like behavior of the gem called alexandrite. By day, for her afternoon teas, alexandrite gives her a cool emerald-green color to match her sparkling chatter and chic attire. For an evening dance at the club under the subdued lights of the ballroom, her alexandrite (without consulting a genie) changes to a soft columbine-red to match her luxurious surroundings and relaxed mood.

This dual-purpose gem is one of several varieties of the mineral known as chrysoberyl. In composition, chrysoberyl proper is a beryllium aluminate, and when pure it is transparent. However, as is commonly the case with minerals, it may contain minute amounts of impurities, such as oxides of iron and chromium, which tint the mineral, imparting pleasing bright colors of yellow, green, and brown.

Chrysoberyl possesses the necessary attributes to be classed as a precious stone—rarity, hardness (only surpassed by corundum and diamond), and beauty. It has long enjoyed a steady but limited demand as a gem. Through the years different varieties have been more popular than others. During the reign of Louis XIV of France, bright yellow chrysoberyls were popular and commanded almost the same price as diamonds. Today, two varieties, alexandrite and cat's-eye (a cloudy chatoyant variety), are most in demand and command high prices.

Alexandrite is a bright blue-green to emerald-green variety of chrysoberyl that possesses a remarkable dichroism. Dichroism is the property of presenting different colors in two different directions. It is possessed by many gemstones, but the chameleon-like behavior of alexandrite is unique. By daylight it is

Illustrations by Maidi Wiebe

GEM WITH 'BUILT-IN GENIE'

To possess an alexandrite gem would be like owning one with a magical character, because it changes color.

bright grass-green or emerald green, and in artificial light it is red to violet. Alexandrite has, therefore, been described as "an emerald by day and amethyst by night." To accentuate this peculiar character the gem must be cut to a certain thickness, the contrast in color being less pronounced in a gem cut with little depth. Suitable thickness of the transmitting layer is an important factor.

Although chrysoberyl proper has been known for several centuries, the alexandrite variety was not discovered until 1833. The discovery was made in the once famous Russian emerald mines situated on the right bank

'ALL-SEEING EYE'

Moslem potentates commonly wore cat's-eye gems as emblems of good fortune, and to remind their subjects of the omniscience of their ruler—a centuries-old version of the "Big Brother" concept.

of the Takovaya River, near the town of Ekaterinburg, in the Ural Mountains. It so happened that the discovery was made on the day set apart for celebrating the birthday of Alexander II, Czar of Russia, in whose honor the stone was named. That circumstance, coupled with the gem's fascinating display of red and green, which were then the national colors, made it very popular in Russia and it was worn with great pride.

Russian alexandrites were found, together with emeralds and many other minerals, in schist and granites. The alexandrites occurred as star-shaped triplets consisting of three crystals twined together, single untwined crystals being extremely rare. Most of the rough alexandrite crystals found were cloudy or full of fissures, and unfit for cutting as gemstones, but occasionally they contained small transparent portions that were free of flaws and markedly dichroic. It was from these portions that gems were cut. Alexandrite gems from the Russian mines were rarely large, but displayed excellent color. When alexandrites were first placed on the market the color change was little understood by dealers or buyers, and a considerable mysticism was attached to it. Because of the rarity of the stone and its popularity in Russia, good alexandrites of any size sold at high prices, both in Russia and in the gem markets of the world.

For some time the Takovaya locality was the only source of alexandrite. Later it was found with pebbles of ordinary chrysoberyl and other precious stones in the gold sands of the Sanarka River in the southern Urals. Both areas were worked out before the close of the 19th century and have only been worked intermittently since that time.

SUPERIOR GEMS IN CEYLON

About the middle of the 19th century alexandrites were found in comparative abundance in the gem-gravels of Ceylon. This area, which soon became the most important source of alexandrite, still continues to furnish a very limited number of gem-quality alexandrites to the gem market each year. The Ceylonese alexandrites show the characteristic dichroism of the Uralian specimens and, on the whole, are of finer quality. The columbine-red color seen by artificial light is especially beautiful and, in general, the stones are larger. One of the largest reported from this area weighed 63½ carats. The average alexandrite from this area weighs about 4 carats.

Ceylon is also noted for the cloudy chatoyant green to honey-yellow variety of chrysoberyl called cat's-eye. This variety when properly cabochon-cut in an elongated oval shows a bright chatoyant line of light across the top of the curved surface of the stone. This phenomenon suggests the pupil of the eye of a cat; hence the name cat's-eye. The phenomenon is caused by a multitude of parallel microscopic channels within the stone. When such a stone is cabochon-cut with the channels in the same plane as the base of the gem, the cat's-eye effect is attained. Because the channels in chrysoberl are hollow, a soft opalescent effect is also produced that is not present in other minerals cut and sold as true cat's-eye, such as varieties of quartz and tourmaline that have a fibrous structure.

True cat's-eye chrysoberyl has long been a popular stone in the Far East. It was, at one time, a favorite gem of the Moslem potentates who wore large cat's-eyes, often carved in the form of some animal, on the front of their turbans as an emblem of good fortune and to remind their subjects of the "all-seeing eye" of their ruler. In the Western world cat's-eye is esteemed as a novelty gem and is to be had only at high prices.

CAVEAT EMPTOR A GOOD RULE

The uninformed buyer when offered either an alexandrite or cat's-eye at a bargain should be wary. Although alexandrite has never been successfully synthesized, synthetic corundum and synthetic spinel that display a color change are incorrectly offered for sale by dealers as "synthetic alexandrite." The tourist who succumbs to the wiles of the sidewalk hawker in a foreign port offering to part with a large alexandrite at a sacrifice may gain a pleasing stone, but at a price far in excess of that for which he could have purchased a similar synthetic from his own jewelers.

Synthetic corundum appears lavender, resembling amethyst, under artificial light, but a bluish-gray by daylight, bearing little or no resemblance to alexandrite. Synthetic spinel displays green to red tints somewhat similar to the alexandrite and, although not truly dichroic, it is easily passed off as genuine to the inexperienced. Good quality synthetic corundum or spinel showing a change of color can be purchased for a few dollars per carat, but true Ceylon alexandrites of good color, when available, command prices near those of diamonds. Perfect alexandrites with good color change, weighing more than 5 carats, are so rare that they have become collectors' items, and almost any price will be paid for their possession. Chrysoberyl cat's-eyes are to be had at prices much below those asked for alexandrites, but they command prices far above the more plentiful and less exotic quartz and tourmaline cat's-eyes.

Ordinary chrysoberyl, in a variety of colors, has been found in alluvial gravels of the rich mineral district of Minas Gerais, Brazil. It is, as a general rule, of poorer quality than the chrysoberyl of Ceylon. Gem quality alexandrites and cat's-eyes are practically unknown in the district. Other places where chrysoberyl has been found are Haddam, Connecticut, and Greenfield, New York, in the United States, and the gem-gravels of Southern Rhodesia, Madagascar, and Upper Burma.

Cut and faceted specimens of several varieties of gem-quality chrysoberyl of exceptional size and beauty from Ceylon, Brazil and Russia are exhibited in the Museum's H. N. Higinbotham Hall of Gems (Hall 31). Outstanding among them is an alexandrite of superior quality, weighing 11¾ carats and having an estimated value of $11,000. Two excellent Ceylon cat's-eyes are also exhibited. When their fascinating chatoyancy is compared with that displayed by the quartz cat's-eyes exhibited in an adjoining case, it is readily understood why true chrysoberyl cat's-eye is much preferred.

Museum Awarded Research Grant for Borneo Project

Chicago Natural History Museum has been awarded a grant of $6,800 by the National Science Foundation for the support of basic research in systematics and zoogeography of the fresh-water fishes of North Borneo. The project is to be carried out by Dr. Robert F. Inger, Curator of Amphibians and Reptiles.

ANT COLONY ASSISTS FOSSIL COLLECTORS IN WYOMING

By WILLIAM D. TURNBULL
ASSISTANT CURATOR OF FOSSIL MAMMALS

FOR the fourth consecutive year, the Museum sent an expedition this summer into the Washakie Basin of southern Wyoming to collect fossil mammals. This season's work was limited to a six-week period in June and July during which time Preparator Ronald Lambert and I collected mainly from the Lower Washakie beds. Inasmuch as these trips have yielded an adequate collection upon which to base a faunal study, this trip also marks the end of our program of intensive systematic prospecting in the Washakie formation. Perhaps larger collections could have been made had we prospected solely for specimens, instead of searching the less promising looking rock facies too, but the collections would then have been representative of fewer paleoecological situations. It is doubtful, for example, that we would have found our microfauna localities with their treasures of rodent, insectivore, carnivore and other small mammalian materials had we followed any other method of prospecting.

This year we put further effort into reworking these microfauna localities. At the 1957 locality in the Upper Washakie beds we obtained a small block of fine-grained sandstone with two clumps of rodent bones showing on the surface. Only careful preparation of the slab will reveal whether or not we have collected nearly complete skeletons. The prospects are encouraging.

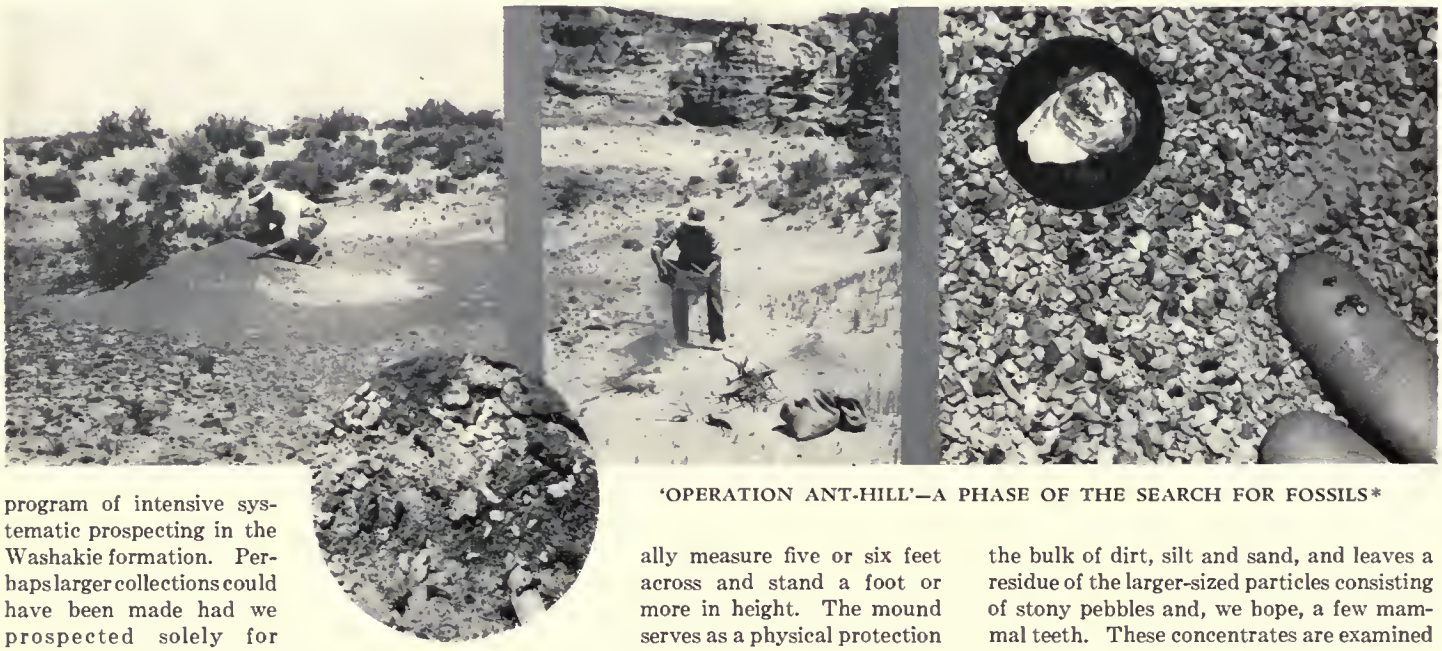
At the 1958 ant-hill locality (Lower Washakie) we again employed the same crew of thousands of industrious red ants that last year helped us to collect the tiny fossil teeth and bones of the rare, 50,000,000-year-old rodents and insectivores. The technique of collecting fossils from ant-hills is long established, having been in use by paleontologists before the turn of the century. As a result of my reference to this technique in the October, 1958 issue of the BULLETIN, many inquiries have been made concerning it. Therefore, Mr. Lambert and I assembled a photographic record of our technique which is described below.

The ant colonies construct cone-shaped mounds for their nests. These mounds usually measure five or six feet across and stand a foot or more in height. The mound serves as a physical protection for the nest which is within and beneath it, and in addition helps to regulate the internal environment of the chambers and passageways. Worker ants build, repair, and enlarge the mound by hauling in sand grains, pebbles, small stones, and any other object of a size and weight they can transport. Winds further modify the surface of the mound by blowing away the finer sand until a shingle of the coarser materials is concentrated over the entire surface.

If one of these ant-hills happens to be located on, or near (within an ant's walking distance, that is), a rock outcrop that contains even a small number of the rare little fossil bones or teeth, it is certain that the pebble-sized fossils will eventually be incorporated into the mound by the undiscriminating ants. This nearly tells the story of the ants' efforts on our behalf—as described below, a kind of incentive compensation scheme can usually induce the colony to work more energetically at its collecting task. The rest is up to us.

There are three stages to the technique: first the surface of any ant-hill in the vicinity of an eroding outcrop is examined for fossils. (Caution: the ants have a fiery bite which stings for 15 minutes!) Generally none are found, but once a hill is located containing specimens, its surface is scraped, shoveled clean of the pebble shingle, and the removed material is dry-sieved, or preferably it is sacked up, and hauled to water to be wet-sieved. This treatment eliminates much of the bulk of dirt, silt and sand, and leaves a residue of the larger-sized particles consisting of stony pebbles and, we hope, a few mammal teeth. These concentrates are examined under low magnification at the Museum and each rare tooth or bone is picked out. The vast majority of the isolated teeth obtained by this technique are those of small fish, reptiles, rodents and insectivores. Occasionally a small carnivore, primate or marsupial tooth will turn up too. The incentive compensation plan I mentioned above depends upon the instinctive survival reaction of the disrupted ant colony. Provided that little damage is done to the ant-hill or its colony, beyond the removal of the surface of the mound, the colony will survive. Then the ants appear to work with frenzied vigor at the task of repairing their roof and the hill may profitably be re-collected the following year.

Actually, ant-hill collecting occupied us for but a few days' time. Most of the time was spent in prospecting and collecting in the more conventional manner which yielded several fine specimens each of titanothere and uintathere post-cranial materials. These



'OPERATION ANT-HILL'—A PHASE OF THE SEARCH FOR FOSSILS*

*Photos indicate how tiny insects aid Museum paleontologists in Washakie Basin area in Wyoming. Left: Typical ant-hill being inspected for the presence of tiny fossil mammal teeth concentrated there by the ants. Center: Sieving the surface shingle of a hill to concentrate further the tooth-sized particles. Right: Closeup of the surface of a hill. Four mammal teeth found in it lie on the man's finger. Left inset: Closeup of a hill after the pebble-shingle has been removed, showing ants actively at work. Right inset: Enlargement of a rodent's molar tooth from the hill. (Photos by Preparator Ronald J. Lambert.)

will enhance the study collections notably. We discovered two interesting crocodile skulls; and a weathered-out, but nearly complete, little uintathere skull was found for us by young Mr. Potter, the son of Gardner Potter, operator of the Eversole Ranch. The Roy Eversoles, John Corsons, Elza Eversoles and the Potters have all been good, helpful neighbors and friends to us during these collecting trips and we are much in their debt for the help they have given us.

Now that the collecting phase of the work is finished, facing us is the task of getting the collections prepared before the materials can be studied in earnest. Several years of work with the Washakie collections lie ahead.

The expedition to Wyoming this year was financed by the Maurice L. Richardson Paleontological Fund.

CHILDREN'S JOURNEY ON GIANT PLANTS

"How big is it?" youngsters often inquire. The query is a general one, asked indiscriminately about plants, animals, rocks, the earth, the universe. Children seem to derive a kind of satisfaction from knowing the size and weight of an object—"the bigger the better!"

Many giants are members of the Plant Kingdom. One of the oldest and largest of living things is a plant. Another giant plant is not only the largest of its kind, but it also grows at the almost incredible rate of 16 inches a day. Still another giant plant, surprisingly enough, consists mainly of water, being able to store up to 30 tons of it in its tissues during heavy but infrequent rainfalls.

Generally, giant plants grow in the warmer regions of the earth, but even the Chicago area can boast of one plant unique for its huge size.

Children can find out what these giant plants are on the Museum's Fall Journey (No. 19), "Giant Plants," offered during September, October, and November. It will direct children to some of the most unusual plants in the world.

The journey sheet is available to all boys and girls who can read. It may be picked up at either the North or South Door of the Museum. When completed, the journey sheet with the youngster's name and address on it is dropped in the barrel at either door.

A boy or girl who successfully completes four different journeys becomes a Museum Traveler. Eight different Journeys qualify aspirants as Museum Adventurers, and twelve as Museum Explorers. Upon the successful completion of 16 different Journeys, a youngster qualifies for a Special Journey, which may admit him to a Museum Club.

MARIE SVOBODA

Common wild flowers of the United States are well represented among the exhibits in Martin A. and Carrie Ryerson Hall (Plant Life, Hall 29).

KATCHINA CULT TRACED BACK TO A.D. 1250

By PAUL S. MARTIN
CHIEF CURATOR OF ANTHROPOLOGY

THE 1959 Archaeological Expedition to the Southwest under the leadership of the writer has found a remarkable ruin on the banks of the Little Colorado River, a few miles away from Springerville, Arizona. It is located on the ranch of Robert Hooper who has been most co-operative and friendly.

The ruin was first discovered and announced to scientists in 1917 by Dr. Leslie Spier, at that time a member of the staff of the American Museum of Natural History. Then, for approximately 40 years it was "lost" in the sense that archaeologists either did not know of the report in which the ruin was briefly described or were not interested in following it up. The local ranchers and collectors, of course, knew about it but did not realize its significance.

Work has not progressed very far as yet; but already we know that this ancient village was at least two stories high and that there are walls on top of walls, rooms upon rooms, walls under walls, sealed-up doorways deep down in the earlier parts of the town—all of which indicate earlier structures and changes in building plans. Thus the nickname "The Troy of Arizona." Other towns like this have been found; but the maze of earlier walls running under later ones is more complex than any we have ever before encountered and the nickname, although given in jest, seemed suitable.

OLDER MASONRY BEST

The masonry of the earlier parts of the town, found many feet below the surface, is excellent and much better than that of the later walls.

Two large depressions probably indicate the location of kivas—ceremonial chambers or sanctuaries wherein were performed the esoteric parts of religious ceremonies. One of these may be excavated later this season.

MOUND IN SOUTHWEST YIELDS TRACES OF PAST
Site of Museum expedition's excavations, near Springerville, Arizona.

Some of the earlier rooms had been despoiled by the later inhabitants who used the rooms as convenient garbage dumps. In this ashy refuse we have found many excellent tools of bone and stone plus discarded and broken pots and pieces of pots.

The dating of all parts of this hamlet is not yet fixed, but we feel fairly sure that the latest portions of it immediately precede Table Rock Site, dug last year. We also guess that perhaps the deeper rooms may be 50 to 100 years earlier than the latest ones—which are tentatively dated at about A.D. 1300.

KATCHINAS DEPICTED

Two tantalizing fragments of a pottery bowl of remarkable significance have been recovered. When glued together, one can see two representations of masked figures called "katchinas." Katchinas were beneficent supernatural beings that, under certain circumstances, could be impersonated by a man wearing a mask. We cannot determine from these fragments whether or not several of these katchinas were depicted on the bowl interior, perhaps holding hands and dancing in a slow ceremonial rhythm, but we conjecture that such is probably the case.

Some years ago it was assumed that the katchina cult, masks, and other ceremonial

(*Continued on page 8, column 1*)

TRAVEL LECTURES, FILMS START OCTOBER 3

The Museum's 112th series of travel lectures, illustrated with color motion pictures will be given on Saturday afternoons beginning October 3, and continuing through November 28. There will be nine programs, all starting at 2:30 P.M. in the James Simpson Theatre of the Museum. Admission is free. The lectures are provided by the Edward E. Ayer Lecture Foundation Fund.

The schedule for October is as follows:

October 3—The Philippines
Eric Pavel

October 10—People and Places in India
John Moyer

October 17—A Missouri Story
Alfred G. Etter

October 24—Mexico
Phil Walker

October 31—Splendors of Persia
Clifford Kamen

KATCHINA CULT—

(Continued from page 7)

paraphernalia were due to Spanish-Roman Catholic influences. More recently, the archaeologists from Harvard University uncovered murals on the walls of kivas that were certainly painted at about A.D. 1400—about

KATCHINAS ON POTTERY

Fragment of bowl unearthed by Museum expedition, showing heads of two impersonators of supernatural beings. Such a bowl is believed to have been imbued with extreme sanctity. Dating from about A.D. 1250, this and other specimens just excavated are the earliest extant evidence of the presence of the "Katchina Cult."

150 years before the advent of the Spaniards. In these murals, one can clearly see masked figures, undoubtedly katchina figures. The murals themselves may be altars, and painted thereon in colors are scenes that probably represent actual ceremonial performances. Since then a few other such murals have been found. These discoveries, then, exploded the idea that katchina masks and other details concerning the ceremonialism of the "katchina cult" were Spanish in origin.

The two fragmentary parts of a katchina bowl that we excavated assume great significance, for now we know that masked men were impersonating katchinas or supernatural beings and that, in brief, the katchina cult was present by A.D. 1250 to 1300 at least, and possibly much earlier. It is my feeling that the religious beliefs concerning katchinas and the whole cult were probably Mogollon in context and may go back to the beginning of the Christian era. Present research suggests that the katchina cult and some aspect of the katchina ceremonies may be the result of stimulus from Mexico.

NEW MEMBERS

(July 17 to August 14)

Non-Resident Associate Member

F. W. Pain

Associate Members

Samuel W. Block, Paul Caspers, John W. Cole, Earle M. Combs, Jr., Lee Cooper, Charles W. Desgrey, Joseph R. Ernest, Harry C. Faust, Mrs. James H. Ferry, Jr., Jones B. Frankel, Dr. Stanton A. Friedberg, Arthur Gettleman, Joseph J. Greeley, Thomas A. Harwood, Arent J. Jacobson, Horace W. Jordan, Joseph J. Kass, Samson Krupnick, Gordon Leadbetter, A. K. Maxwell, Jr., Joseph E. Nathan, Elmer G. Norell, Harry D. Perkins, Frederick Roe, Joseph H. Schwartz, William W. Sims, Francis B. Stine, J. McWilliams Stone, Sr., Paul Stratton, George Tiberius, William A. P. Watkins, Frederick F. Webster, Horace O. Wetmore, Harry J. Williams

Annual Members

Dr. Robert Adler, Dr. Carl Apple, Mrs. Julius Auerbach, Mrs. Helen A. Augustus, Mrs. Warren G. Bailey, Mrs. Peter M. Baird, Jr., Andrew W. Bunta, Mrs. Coula P. Butler, Hyman Bryer, Jack L. Camp, John C. Castanes, John T. Chadwell, Gordon Close, Dr. Donald F. Farmer, W. N. Fritts, Dr. Vladimir C. Flowers, Dr. Melvin C. Godwin, C. A. Grentzner, R. P. Gwinn, Mrs. C. E. Hansen, Sol W. Herman, Warren Jackman, Maurice H. Jacobs, Mrs. Mabel S. Johnson, George Keck, Victor E. LaRue, L. J. Laurion, Seymour N. Logan, Dr. Audley R. Mamby, Francis Mangan, Dr. Charles R. Matera, Robert V. Mehaffey, John F. Meissner, Dr. Robert S. Mendelsohn, Miss Sarah E. Mildren, Albert Mohr, Jr., Mrs. Albert E. Munn, Mrs. Thomas S. McEwan, Herman A. Neiburger, Mrs. Mae Sexton O'Brien, Jr., Mrs. Charles H. Percy, Clifford J. Peterson, E. J. Pool, Dr. William T. Raleigh, Franklin J. Rich, Miss Virginia M. Roos, Irving J. Sachs, Sidney Salins, Joseph M. Scanlan, Leonard Schanfield, John W. Schelthoff, Max Segal, Mrs. Arthur B. Seibold, Jr., William R. Seibert, Al B. Sheen, Morris T. Singer, Alex Stikkers, Mrs. John Otto Stoll, Mrs. Paul Sywulka, Mrs. Adrian Tabin, Mrs. Albert Tabin, Seymour Tabin, Mrs. John Ailes Taft, Warren G. Tyk, Mrs. H. H. Urbach, Mrs. J. W. Van Gorkom, Robert A. Van Meer, J. A. Volkober, E. Algerd Waitkus, Dr. O. B. Williams, Dr. Ralph G. Willy, Dr. Earle E. Wilson, Dr. Drake R. A. Witty, Dr. Theodore Worth, Dr. Victor J. Zielinski

MOVIES FOR CHILDREN BEGIN OCTOBER 3

The strange and fascinating wonders of the desert will come alive on the screen in Walt Disney's True Life Adventure story, **"The Living Desert,"** on **October 3** in the Museum's James Simpson Theatre to open the Museum's fall program of movies for children. The motion picture, which captures all the beauty of the desert in color, is the first in the series of films.

Children will be able to see these movies free every Saturday morning during October and November at 10:30, and are invited to come alone, accompanied by adults, or in groups. The series of free programs is sponsored by the James Nelson and Anna Louise Raymond Foundation.

Other movies scheduled include:

October 10—Adventures of Huckleberry Finn

Mark Twain's classic story of the Mississippi River, and a sequel to Tom Sawyer

October 17—Gulliver's Travels

The animated technicolor picture of Jonathan Swift's literary classic of Gulliver's travels to the Kingdom of Lilliput

October 24—A World Is Born

The story of life on this earth in prehistoric times . . . Also a cartoon

October 31—Between the Tides

Nature's mysteries of the sea—"the edge of the unknown" . . . Also a cartoon

A complete schedule of the nine children's programs for October and November will appear in the next BULLETIN.

Malacologist Returns

Dr. Fritz Haas, Curator Emeritus of Lower Invertebrates, has returned from a field trip of three weeks in the northwest corner of North Carolina. Near the little town of Highlands, the highest incorporated town east of the Rocky Mountains, situated at an elevation of 4,000 feet, there is one of the few inland biological stations of the United States. There Dr. Haas had his headquarters, and from there he searched the surrounding mountains and woods for representatives of mollusk life.

West Indies Fish Collecting

Fishes of West Indian waters from the vicinity of Puerto Rico to the Virgin Islands, and from the Saba Bank in the Lesser Antilles will be collected by Loren P. Woods, Curator of Fishes, this fall. He has been invited by the United States Fish and Wildlife Service to join a research and exploratory cruise aboard the motor vessel *Oregon*, on which in past years he has made several other expeditions.

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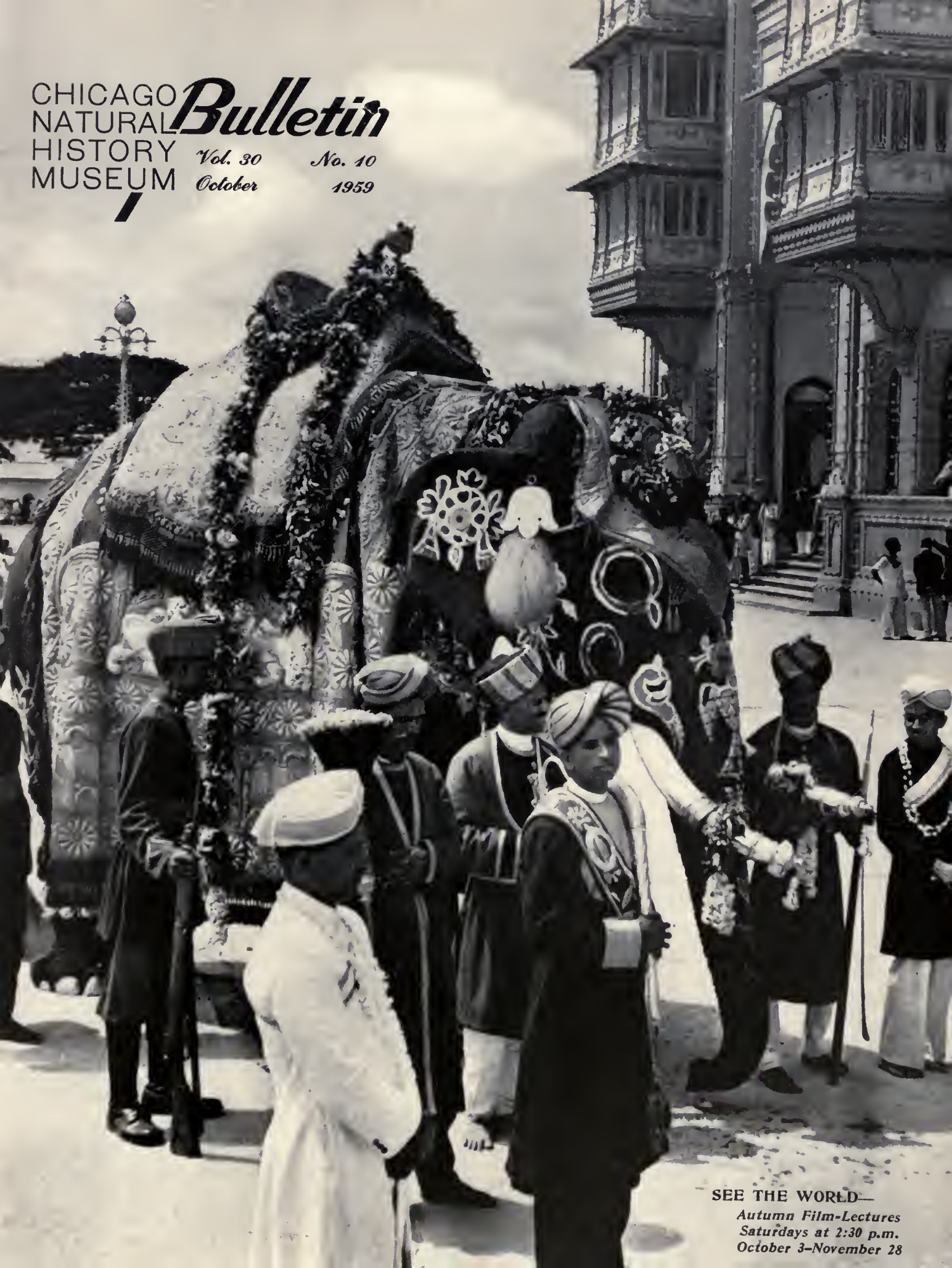

SEE THE WORLD—
Autumn Film-Lectures
Saturdays at 2:30 p.m.
October 3–November 28

Chicago Natural History Museum

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Members are requested to inform the Museum promptly of changes of address.

SCULPTURES AND PHOTOS OF INDIA IN EXHIBIT

"People and Places in India," another in the Museum's special exhibits that have been drawing more and more public attention, will be on display October 2 in the west end of Albert W. Harris Hall (Hall 18) and will continue on exhibition through November 30.

Planned to coincide with the opening, on October 3, of the Museum's fall travel lecture series, the exhibit of sculptures and photographs will be supplemented by a color motion picture, also called "People and Places in India," personally narrated by John Moyer of the Museum staff, to be presented on October 10. Moyer's film will be the second in the series of travel programs and includes sequences corresponding to many of the still photographs in the exhibit. One sequence shows in detail how the small clay models of Indian people that are a part of the exhibit were made by native craftsmen.

The special exhibit comprises 36 of these figures, as well as 40 photographs taken all over India. The human figures were modeled by artist-members of a small caste of people living in the village of Krishnagar in West Bengal state, about 70 miles north from Calcutta. This village is today the chief center of this particular art. The figures are modeled directly in clay, sun dried, then colored to bring out the flesh tones, and finally dressed in actual textiles representative of the different types of clothing worn in India.

The photographs, selected from more than 400 negatives, were taken over a period of three years while Mr. Moyer, who is in charge of the Division of Motion Pictures, was on leave of absence from the Museum to perform a special assignment as a consul of the United States. The photographs chosen demonstrate the different types of country one crosses in traveling from the northern boundary of India along the Himalayan range down to the rain forests of Cape Comorin in the extreme southern tip. The different peoples and castes who comprise the population of India are shown engaged in their various typical daily activities.

PRIMITIVE WATER SERVICE

Sculpture of native tribal girl with jug represents one of many diverse peoples living in India. Her type is found in the state of Bihar.

SNAKE CHARMER

Clay model represents one of the sights so familiar to travelers in India that it has become symbolical.

The small figures in the exhibit are noteworthy in that the process of modeling them is one of the many cottage industries that India is trying so hard to preserve for future generations. Many years ago there were toy-makers in nearly every village in India turning out dolls and toys of wood and clay for local fairs and for the amusement of children. With the importation of toys into India in recent times, mainly from China, this native art is slowly dying out. Today there are only a few families with the skill and knowledge to capture and faithfully reproduce the facial characteristics and mode of dress of the many different types of people who live in India.

The government of India is anxious to preserve and to promote the cottage and small-scale industries to help the economy of the country. The handicrafts of any country have always revealed the innate artistic tastes of the people, and Indian craftsmen have for centuries been known the world over for the beauty of form and color they attain. Indian potters and sculptors from prehistoric times have been master craftsmen, and the figurines of the people of India in the exhibit are exquisite examples of their work.

THIS MONTH'S COVER

Our cover is intended to typify the easy way of world travel—by means of the color films and lectures offered at the Museum on Saturday afternoons during October and November (see page 3). Specifically, this picture of the sacred elephant of the Maharajah of Mysore is a scene from the October 10 lecture, "People and places in India," to be given by John Moyer as the second program in the series. The occasion pictured is an annual celebration in southern India known as the Dessurah. This pampered elephant, which does no labor and which no one is allowed to ride, is "dressed" in costly and luxurious trappings—purple velvet coverings, a hand-tooled leather saddle that is a work of art, and garlands of flowers. Floral designs, repainted every day, adorn the creature's trunk, forehead, eye areas, ears, legs and tail. The elaborately costumed men are officials, and mahouts, or elephant attendants. In the background at right appears part of the south wing of the maharajah's palace, the largest and most ornate structure of its kind in India.

An interesting exposition of the principles of fish coloration and how certain fishes change colors under varying conditions is offered in the Hall of Fishes (Hall O).

SEE THE WORLD: FILM-LECTURES TO BEGIN OCTOBER 3

AN OPPORTUNITY to see the world through the eyes of experienced explorers is offered those who attend the Museum's 112th illustrated travel lecture series. The lectures will be given each Saturday at 2:30 P.M. during October and November in the James Simpson Theatre.

The color motion pictures, accompanied by narratives delivered by the "wandering" photographers, reach to the far corners of the world for subject matter—from the sparsely populated plains of wind-swept Patagonia to mysterious India, a land teeming with people.

The travel series is sponsored by the Edward E. Ayer Lecture Foundation and is free to all Museum visitors. Members of the Museum may claim reserved seats by presenting their membership cards before 2:25 P.M. on the lecture day.

Following is the schedule:

October 3—The Philippines

Eric Pavel

Corregidor, the United States' last fortress against the Japanese invaders at the end of World War II, focused the attention of the world on the group of 7,100 islands off the southeast coast of Asia—the Philippines. Geographically lying in the Pacific Ocean, culturally the Philippines float on the cross-stream of East and West, old and new. Eric Pavel takes you to the fascinating islands for an enlightening glimpse of their beauty and unique customs. In the rich valleys of Luzon you'll see active Mayon volcano, the world's most perfect cone; cock fights and town fiestas; the life of the family around its Nipa hut. And in striking contrast you'll see modern Manila—Pearl of the Orient—completely rebuilt after the war.

October 10—People and Places in India

John Moyer

India . . . timely and timeless . . . a land of mystery and intrigue, its fascination spurring men like Columbus to strike out on a strange ocean in hopes of reaching its alluring shores. A land of superlatives, India to this day stimulates men's imagination and interest. John Moyer takes you to mysterious India in an unusual film of that country, including a first-hand account of the Dusserah, famous religious celebration at Mysore. From Calcutta, largest city in the Far East, to Mt. Kanchanjungha, third highest in the world, to Cherrapunji, wettest spot on earth, India beckons for an enjoyable and memorable experience.

October 17—A Missouri Story

Alfred G. Etter

Rural Missouri, which has made important contributions to the American tradition, has become a part of many famous books and stories. However, with the construction of more and more tollways and superhighways to create a giant transportation network across the nation, the existence of the undisturbed pastoral scene, the family farm, and the woodlot is being threatened. Before it was too late, Dr. Alfred Etter, native Missourian, recorded life as it used to be on an old Missouri farm—the daily chores, the caprices of the seasons. "A Missouri Story" is an acknowledgment of the permanent value of scenic, wild, and natural places.

October 24—Mexico

Phil Walker

Mexico is often characterized as a land of "variety and spice"—spice because the native cuisine is probably some of the hottest you'll find anywhere in the world; and variety, because the topography of Mexico is as varied as all of the world combined, and with almost as many variations of weather. In Phil Walker's colorful motion picture you visit many cities of this interesting land, including Mexico City, Guadalajara, and Acapulco, as well as the vast and open Mexican countryside. The fiestas portrayed in the film characterize Mexico as a country apart, continuing customs that elsewhere would be revived only for tourists and special holidays.

October 31—The Splendors of Persia

Clifford J. Kamen

Long noted for its riches that made it once the greatest and most powerful empire on earth, Persia is experiencing today a rebirth in world influence by virtue of possessing an important and valuable commodity—one of the world's richest reserves of petroleum. Thus Persia (Iran) is again on the threshold of becoming a strategically important modern nation. Clifford J. Kamen's "The Splendors of Persia" is a comprehensive and accurate film narrative in which you will see Persia's vast deserts that conceal its great oil reserves; Abadan, the world's largest oil refinery; quiet gardens, like those which inspired Omar Khayam; Isfahan, the jewel city of the Moslem world; primitive mountain tribes; lovely oases; and magnificent jewels that have graced the crowns of Persian monarchs for thousands of years.

November 7—Scotland

Nicol Smith

The "high road" to an enjoyable afternoon is found in Nicol Smith's motion picture on Scotland, land of heather, bagpipes, and kilts, when you tour its rolling hills and marshy glens. From ancient castles to bustling fishing ports Scotland is a country steeped in tradition. Harwick is an important stop in which Nicol Smith's film features the story of sheep and the superb woolens which are among the world's best. There is the Mull of Galloway, the southernmost point in Scotland, rich in legend and history. And not to be left out of any film of Scotland is Edinburgh, the beautiful city of parks and palaces, an old and romantic shrine for the traveler.

November 14—Probing Antarctica

Finn Ronne, USNR

Captain Finn Ronne, Commander and scientific leader of the Ellsworth Station in Antarctica during 15 months of the International Geophysical Year, returns to the Museum stage with an exciting account designed to dispel the misguided ideas of those individuals accustomed to thinking of Antarctica as a barren, uninteresting wasteland of bleak ice and snow. His color film shows how he and 38 fellow scientists lived, worked, and found recreation on the Antarctic ice cap as it is seen when illuminated by the rainbow colors of the summer sun when it breaks over the vast frozen expanses of snow and ice. Portrayed in both its drama and humor is the unusual Antarctic wild life—baby seals from birth to their first swimming stroke, killer whales lurking silently in the chill waters, and the comedian of the South Pole, the Emperor Penguin. Via motion picture you will travel 1,100 miles with Captain Ronne, sharing with him all his thrills and discoveries.

November 21—Patagonia

Malcolm Miller

Sparsely inhabited, a land of constant high winds, a territory unfamiliar even to many people who have traveled extensively, Patagonia, at the far southern tip of South America, is a land of unusual scenes, cities, and people. Dr. Malcolm Miller takes you on a 5,000-mile jeep trip across the vast lands of Argentinian Patagonia. In the film are included the story of the Patagonian sheep rancher, a visit to a Patagonian Shangri-la, and a flight to Aconcagua, the western hemisphere's highest mountain. Of especial scientific interest is the material on the magnificent glaciers, the huge unexplored ice cap, and the strange forms of wild life in its sub-Antarctic mountains.

November 28—Japan

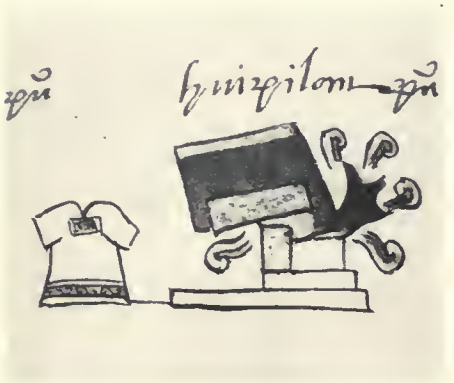
Gordon Palmquist

A mixture of the ancient and the modern is Japan, a country of colorful Oriental tradition that has survived through the centuries. Gordon Palmquist presents the beauty of Japan in an up-to-date film story of the Japanese people. From growing rice at the foot of Mt. Fuji, to a Japanese Shinto wedding, and from geisha dancing, to a championship Sumo wrestling match you are given a glimpse of Japanese life as it existed in the past; while, on the other hand, Japan shows its modern face at Hokkaido University, Tokyo and Hiroshima, and inside one of Japan's up-to-date camera factories.

ANCIENT AZTECS HAD 'COMMERCIAL ARTISTS'

By ALFRED LEE ROWELL
DIORAMIST—ANTHROPOLOGY

SOMETHING more than 400 years ago Don Antonio de Mendoza, the first viceroy of New Spain, signed a report on the history and mores of the Aztec people and dispatched it by the first Europe-bound ship for delivery to Charles V of Spain, Emperor of Everywhere except England, France and



AZTEC HISTORY
Glyphs recording capture of town named Huipilan.

a few other places. The ship was captured by French pirates, and the report intended for the Spanish king went instead to the Royal Cosmographer of France. Later it was sold to a British diplomat, and eventually it reached the Bodleian Library at Oxford. In 1925 the National Museum of Mexico published a photographic facsimile edition, with explanatory text in Spanish, under the title *Codex Mendocino*. A copy of this edition is now in the Library of Chicago Natural History Museum.

The work is in three parts: (1) The History of the Aztecs up to the Conquest; (2) the famous Tribute Lists of Montezuma; and (3) Aspects of Aztec Life and Social Organization.

All three parts were produced by the Aztec equivalent of what we call commercial artists. This statement may sound strange since we are accustomed to think of Indian art as decorations on pottery, crude designs painted on shields, rough pieces carved from stone, or some other non-objective work extremely unlike our present-day commercial art. But the function of these Aztec artists was to produce a record rather than works of art; to represent tangibles rather than to express emotions; to deal with facts more than with feeling. They were reporters, not editors or commentators, and their work was strictly objective—and thus is closely akin to the motivation of commercial art. Like all good commercial artists, they were well skilled in their trade.

Bernal Diaz del Castillo, in his *True History of the Conquest*, gives an example of their draftsmanship. When Montezuma heard that the Spaniards had landed in the region of Veracruz, the delegation he sent to meet them included artists who were to bring back portraits of the Spaniards and pictures of their equipment—"the whole army, in fact, including even the two greyhounds." When the Aztecs returned after reporting to Montezuma, they brought "a Mexican chieftain named Quintalbor who looked like Cortez both in face and stature. He had been sent on purpose because when Montezuma saw the portraits of Cortez he recognized immediately the resemblance to Quintalbor. In our camp we called Don Hernando 'our Cortez,' and Quintalbor 'the other Cortez.' "

Only a skilled artist could have drawn a likeness good enough to produce these results.

The historical account in the first part of the *Codex* appears to be nothing more than repetitions of burning temples, but these are pictographs or picture-writing, and the artist who drew them was serving as a scribe. Each picture of a burning temple is really a glyph meaning surrender or conquest, and each one has with it the name glyph of a town. The two together, of course, mean the conquest or surrender of that town, with or without burning or destruction, and each series means that those towns were added to the empire during the years indicated by the calendar symbols on the margin of the page. Thus it was literally true in this case that anyone who could learn to write could learn to draw, because anyone who could write in pictographs had already learned to draw.

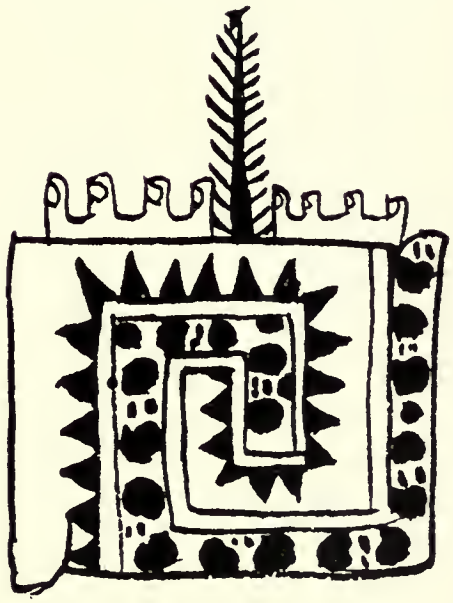
The drawings in the second part of the *Codex* are different. Here the artist acted as a bookkeeper. The Tribute Lists, as the name implies, showed the amount and kind of tribute required to be brought in by the pueblos named by the glyphs on each list. The amounts were fantastic: one list shows

DISCIPLINE IN OLD MEXICO
Picture from Codex Mendocino showing an Aztec father punishing his son by holding the boy's head in the acrid smoke of burning chili peppers.

that thirteen pueblos were compelled to send in once a year 3,200 mantles, 400 breech clouts, and 400 women's dresses along with some other material. The method of making an entry was to make a drawing of an object with a number symbol to show the quantity. Whatever else might be said about these drawings, they had to be accurate — they were "legal language."

In the third part of the *Codex*, the artist recorded clearly and understandably some of the details and practices of daily living, such as the training of children, which must have been rigorous. The punishment illustrated for an 11-year-old was to hold the child in the smoke of burning chili-peppers. Two men, apparently the prototype of officers of a juvenile court, are shown dissuading a youth who wanted to go vagabonding—one is giving him a haircut with an obsidian blade, while the other is burning his head with firebrands.

A wonderful page makes a comparison between respectable youths and delinquents. An upper-class young man, perhaps the son of an official, is shown in the attitude of not working, on his way to the teacher to be educated. Two boys destined to be unskilled laborers are tearfully receiving instruction



MONTEZUMA'S BOOKKEEPING
This glyph is an example of Aztec accounting entry. It signifies 400 pieces of cloth 22½ feet long with design as shown. The pine tree represents 400, and each pair of thumbs means a fathom of 5½ feet.

from the Superintendent of Works; several middle-class artisans are teaching their respective skills to their sons. In contrast to all this respectability are the vagabond, the thief, the gambler, "the vicious one of evil tongue and gossip" (shown in the attitude of idleness), the drunkard—and drunkardess—with a threatening noose at the end of the list. It speaks well for all who follow his calling that the artist had enough respect for it to include himself and his son among the solid citizens.

The punishment for drunkenness is extremely severe, but it all ends on what some people might consider a high note—perhaps a fitting conclusion for any remarks about commercial artists. That is, it is indicated that when people reached a ripe old age, they were free to drink all they wanted, or could

contain, and nobody was permitted to interfere with their enjoyment.

More than thirty years after the Conquest, and after the introduction of the Roman alphabet, the Spanish authorities still found the work of the Aztec artists so valuable that a Chair of Pictography was established at the University of Mexico in 1553. Now, four centuries later, we still are able, like the 16th century Spaniards, to make good use of this ancient art. The *Codex* was practically our only source for the details of clothing and headdress as well as much of the other material shown in the Aztec diorama recently installed in Hall 8 (Ancient and Modern Indians of Mexico and Central America). It would have been possible, without the *Codex*, to conjure up a model of a market, but it could not have been the live-appearing, authentic Market of Tlatelolco we were able to produce from the work of these capable Indian artists.

AZTEC TRADE

By DONALD COLLIER
CURATOR OF SOUTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

Display of the Aztec Market diorama recently installed in Hall 8 (Ancient and Modern Indians of Mexico and Central America) has given rise to questions by visitors to the Museum concerning the method of exchange of goods in the Great Market.

The Aztecs did not have money, that is, an exchange medium of fixed value. Transactions were carried on by means of barter. However, there were several products with intrinsic value that served as mediums of exchange and helped to balance inequalities in barter. The most important of these was cocoa beans, which were in universal demand for making the chocolate drink of which the Aztecs were so fond and which is still drunk in Mexico today. The chocolate beans were grown in tropical zones and transported to the cool plateau of the Aztecs. There was even "counterfeiting" of the beans in a manner which anticipated the wooden nutmegs of Yankee traders. The beans were hollowed out and filled with clay so as to have the same weight and appearance as before the tampering. We can imagine wary vendors biting chocolate beans instead of coins.

Other products used in exchanges were quills of gold dust, thin crescent-shaped knives of copper (not useful as knives) and jade and turquoise. But none of these was as important as the cocoa beans. The Aztecs did not prize gold highly for itself but valued it for its suitability for casting ornaments by the lost-wax process.

The story of three billion years of life is told in two halls of fossils—Frederick J. V. Skiff Hall (Hall 37) and Ernest R. Graham Hall (Hall 38).

NATURE'S SECRET: SOURCE OF U.S. DIAMONDS

By ALBERT W. FORSLEV
ASSOCIATE CURATOR OF MINERALOGY

ONE DAY in March, 1867, a man by the name of John O'Reilly, returning from a hunting trip near the Vaal River in South Africa, stopped to rest at the farm of Shalk van Niekerk in the Hopetown district. While examining an assortment of pebbles that Mr. van Niekerk had collected, he noticed one which seemed to stand out from all the rest. Because of O'Reilly's interest Mr. van Niekerk presented him with this stone. Upon arriving at Colesburg, Mr. O'Reilly showed it to a government official, who, finding that it cut glass, asked O'Reilly if he might send it to Grahamstown for identification. This was agreed upon and shortly thereafter they received the following letter: "I congratulate you on the stone you have sent me. It is a veritable diamond, weighs 21¼ carats, . . . It has spoiled all the jewelers' files in Grahamstown; and where that came from there must be more."

PROFESSIONAL TREASURE SEEKERS
Old photograph shows workers sorting gravel for diamonds in South Africa.

This event was destined to open a new chapter in South African history, for Mr. O'Reilly's stone was the first diamond found in South Africa.

The discovery naturally touched off a "rush" on the van Niekerk farm but no further important finds were made until two years later when the famous "Star of South Africa" was found, a pure white diamond of 83½ carats. (A model of this diamond is displayed in H. N. Higinbotham Hall of Gems—Hall 31).

The first true diamond deposits in South Africa were discovered in alluvial sediments (sand and gravel) at Barkly West on the banks of the Vaal River in 1869. Within two years the famous "pipe" mines of Dutoitspan, Bulfontein, DeBeers, Kimberley, and Jagersfontein had been discovered.

Needless to say these discoveries turned one of the most worthless possessions of Great Britain into one of the most valuable. The subsequent development of the diamond industry in South Africa has made the word "diamond" almost synonymous with "Africa."

FOUND EARLIER IN U.S.

It is perhaps a little-known fact that diamond finds in our own country predate the South African discovery. A 23¾-carat rough diamond was found in 1855 in Manchester, Virginia, by a man grading one of the streets. It is believed that this stone, called the "Dewey diamond," may have been brought down from the mountains by the James River during spring floods. Since that time two other diamonds have been found in Virginia under equally unexpected circumstances.

Altogether, several thousand diamonds have been found in the United States. Although the major deposit and only significant one occurs in Arkansas, well authenticated finds have been reported from at least thirteen states.

The Arkansas diamond field is near Murfreesboro in Pike County. Here the diamonds occur in volcanic pipes composed of peridotite, an occurrence similar to that of the South African "pipe" mines. Almost 50,000 stones have been found since John M. Huddleston discovered the first one in 1906 about two and one-half miles south of Murfreesboro. Although less than 10 per cent have been of gem quality and most of these small in size, occasional large stones have been found. The largest diamond ever found in

the United States comes from this deposit. It is a rose-tinted stone called the "Uncle Sam," which weighed 40.23 carats when found in 1924. Some recent diamonds found

Cartoon by Maidi Wiebe

in Arkansas include a perfect 15.33-carat blue-white stone found on March 4, 1956 and a 3-carat blue-white diamond found in May of the same year.

Although several efforts have been made over the years to recover diamonds on a commercial basis from this deposit, none have been successful. It is now known as "Crater of Diamonds" and for a fee visitors are permitted to prospect in the mine area. For those who may be interested in trying their luck, I might point out that most of the diamonds are found in the spring when they are uncovered by heavy rains.

The only other place in the United States where a diamond has been reported found in the rock in which it was formed is in a peridotite dike near Syracuse, New York. A graduate student at Syracuse University is reported to have found a small transparent stone in 1920.

OTHER OCCURRENCES

The next most important occurrence of diamonds in this country is in alluvial deposits where the diamonds have been weathered out of the original rock matrix, carried to distant points by streams, and deposited with sand and gravel. Some 400 or 500 stones have been recovered from Californian deposits in the western foothills of the Sierra Nevada. Most were chance discoveries made largely during placer gold mining operations prior to 1920. The majority of these stones are small and show a yellowish tinge.

Other occurrences of diamonds in alluvial deposits have been reported from Idaho, Oregon, and Washington, but these have produced only a few small stones.

The largest "alluvial" diamonds have been found in the Southeast, in West Virginia, Virginia, and North Carolina. Alabama and Georgia claim a few small stones. The largest of the southeastern stones is the "Punch Jones" diamond found at Peterstown, West Virginia in 1928. It weighed 24.46 carats and was supposedly found by a Grover C. Jones and his son while pitching horseshoes. It was named after Mr. Jones' son whose nickname was "Punch."

It is interesting to note that although "alluvial" diamonds have been found in many places in this country, the original source of the stones has never been discovered. Not too far away from these finds are areas of peridotite and other basic rocks from which these stones may have been derived. A search for diamonds in these rocks has, however, so far proved unsuccessful.

GREAT LAKES FIELD

A relatively large number of diamonds has been found in the Great Lakes region in association with the glacial drift deposited by the ice sheet that at one time covered the north-central United States. These are called "immigrant" diamonds since the original source of the stones was probably in the rocks of southern Canada, in the region south of Hudson Bay. These diamond-bearing rocks were eroded, transported by the glaciers during Pleistocene times, and deposited with other glacial sediments in the states of Wisconsin, Michigan, Indiana, and Ohio. The diamonds were separated from their rock matrix and occasional stones have been discovered purely by chance.

Wisconsin lays claim to about 20 stones, the largest being a wine-yellow diamond weighing 21¼ carats, discovered by a farmer while plowing a field at Kohlsville in 1886. As would be expected, many of these stones have interesting histories after their discovery. For example, a diamond over 15 carats in weight, found while digging a well near Waukesha, was purchased by a Milwaukee jeweler for $1. After the true value was discovered, the original owner tried to buy back the stone for $1.10 and upon refusal of the jeweler to accept this offer, brought suit against him. The case was carried to the state Supreme Court which handed down a decision in favor of the defendant on the grounds that he had been ignorant of the value of the stone at the time of purchase.

Other Wisconsin diamonds of note weighing between two and seven carats have been found at Oregon, Saukville, and Burlington.

Only one diamond has been found in Michigan, an 11-carat diamond found at Dowagiac, about twelve miles northwest of Niles. The area was subsequently searched for more but with negative results.

Ohio, likewise, has furnished one diamond —a perfect white one weighing 6 carats found near Milford in 1897.

TEN IN INDIANA

At least ten authenticated finds have been made in Indiana. Nine of them were in Morgan and Brown counties in the south-central part of the state. One of 3.33 carats has been found near Peru, Indiana.

Before you set out to look for diamonds, I would like to point out that with the exception of the Arkansas diamonds all of the finds have been completely accidental. Many people have gone out expressly for the purpose of finding the source rocks of the "alluvial" and "immigrant" diamonds, but no one has succeeded. That is not to say that no one ever will, but the diamond-bearing rocks may have long been eroded away. Because a stone will cut glass is no proof that it is diamond for there are many minerals harder than glass. One of these is quartz, the most common individual mineral species.

Because of the appeal that diamonds have to most people and the high value associated with the gem varieties, it is needless to say that many frauds have been perpetrated on unsuspecting and unknowing individuals over the years.

New Assistant Appointed in Public Relations

Marilyn Jindrich, a native Chicagoan, has been appointed Assistant in the Museum's Division of Public Relations. She fills the vacancy made by the resignation of Patricia McAfee who has moved to another city because of her recent marriage.

Marilyn Jindrich

Miss Jindrich is a graduate of the Medill School of Journalism of Northwestern University with the degree of Bachelor of Science. At the Museum she will work in press, television and radio activities, in association with H. B. Harte, who has been Public Relations Counsel since 1927. The position also includes associate editorship of the BULLETIN. At Northwestern Miss Jindrich was a leader in numerous campus activities. She has been employed in several capacities, but the Museum position is the first in the profession for which her journalistic training has qualified her.

Archaeological Reconnaissance

During July and August, George I. Quimby, Curator of North American Archaeology and Ethnology, made field trips to archaeological sites in northern Michigan. He was seeking information about the environment of Archaic Indians in the period from 6000 B.C. to 1500 B.C., and trying to locate Late Woodland sites of the period from A.D. 1500 to 1650. Test excavations were undertaken in three important sites, and surface collections were obtained from five sites.

Changes in Visiting Hours

This year, autumn visiting hours at the Museum, 9 A.M. to 5 P.M., will continue in effect through October 31, instead of changing in mid-month as in past years. Beginning November 1, and continuing through February 28, the winter schedule will go into effect: 9 A.M. to 4 P.M. (5 P.M. on Saturdays and Sundays).

STAFF NOTES

Dr. Donald Collier, Curator of South American Archaeology and Ethnology, participated in sequences of a film surveying the special exhibit, Indian Art of the Americas. The motion picture, made for the U.S. Information Service, records all activities embraced in Chicago's Festival of the Americas and Pan American Games, and will be shown to audiences around the world. Dr. Collier was interviewed also on a radio program of World Wide Broadcasting System, Inc. (WRUL) directed particularly to Spanish-speaking countries of Latin America. . . . **Dr. Austin L. Rand,** Chief Curator of Zoology, and **Emmet R. Blake,** Curator of Birds, attended the recent meetings of the American Ornithologists' Union in Regina, Saskatchewan. . . . **Dr. Robert F. Inger,** Curator of Amphibians and Reptiles, has returned from four months of field work in the Belgian Congo, and three months of studies in major European museums. . . . **Dr. Alan Solem,** Curator of Lower Invertebrates, was elected Counselor-at-Large at a recent meeting of the Malacological Union in Philadelphia. . . . **D. Dwight Davis,** Curator of Anatomy, attended the meetings of the American Institute of Biological Sciences at Pennsylvania State University, after which he proceeded to Washington, D.C., for certain studies at the U.S. National Museum. . . . **Robert J. Reich,** a native Chicagoan, has been appointed Custodian of the Herbarium. . . . **Dr. Kenneth Starr,** Curator of Asiatic Archaeology and Ethnology, lectured on Chinese rubbings before a student-and-faculty group at the University of Michigan, and gave a demonstration of this art on a television program from the Ann Arbor station.

Admission Is Free . . .

CHILDREN'S MOVIES ON SATURDAYS

Nine programs of motion pictures for children will be presented in the autumn series of the Raymond Foundation. Admission is free, and the shows will be given in James Simpson Theatre of the Museum on Saturday mornings at 10:30. Children may come alone, in organized groups, or accompanied by adults.

Dates and titles of films are as follows:

October 3—The Living Desert

Walt Disney's True Life Adventure story of the life of creatures that inhabit the desert

October 10—Adventures of Huckleberry Finn

Mark Twain's classic of youth on the Mississippi River

October 17—Gulliver's Travels

Jonathan Swift's story of Gulliver's Travels to the Kingdom of Lilliput . . . In animated color

October 24—A World Is Born

The story of life in prehistoric times . . . Also a cartoon

October 31—Between the Tides

Mysteries of nature in the sea . . . . "the edge of the unknown." Narration for the Strange Sea Animals section by Maryl André of Museum staff . . . Also a cartoon

November 7—The Magic Horse

An animated cartoon based on the old Russian folk tale about a boy and his tiny horse that has magical powers

November 14—The Adventures of Chico

A children's favorite: the story of a little boy and his pet bird in Mexico

November 21—Kon Tiki (*Museum Traveler Day—presentation of awards to children who have completed series of Museum Journeys*)

The voyage of a group of young Scandinavians from South America to Pacific islands on a balsa raft

November 28—An All-Cartoon Program

Willy, the Operatic Whale; Susie, the Blue Koop; and A Cowboy Meets a Horse

An innovation will be made with this season's programs: each boy and girl attending will be given an exploration sheet directing them to Museum exhibits in which they can see material related to the stories of the films.

Technical Publications

The following technical publications were issued recently by the Museum.

Fieldiana: Zoology, Vol. 36, No. 3. *Report on a Collection of Marine Fishes from North Borneo.* By Robert F. Inger. 67 pages, 1 illustration, 1 map. $1.

Fieldiana: Zoology, Vol. 42, No. 2. *Philippine Zoological Expedition 1946–1947. New Birds from the Philippines.* By Austin L. Rand and D. S. Rabor. 6 pages. 15c.

Fieldiana: Zoology, Vol. 39, No. 12. *The Races of the Bush Shrike Dryoscopus cubla.* By Austin L. Rand. 3 pages. 10c.

Fieldiana: Geology, Vol. 10, No. 32. *Fauna of the Vale and Choza: 14. Summary, Review, and Integration of the Geology and the Faunas.* By Everett Claire Olson. 52 pages, 20 illustrations, 1 map. $1.25.

Fieldiana: Zoology, Vol. 39, No. 13. *Tarsal Ligaments of the Spectacled Bear Tremarctos ornatus.* By D. Dwight Davis. 15 pages, 7 illustrations. 40c.

GIANT PLANTS ARE LURE ON CHILDREN'S JOURNEY

"Giant Plants" continues as the subject of the Museum Journey for children through October and November. It may be taken by any boy or girl, any day, at any time within Museum visiting hours. At either entrance of the building, children will receive, on request, their "travel directions" which will guide them to various exhibits showing some of the world's largest kinds of plants. From these, the youngsters may obtain the information enabling them to fill in the answers to questionnaires which accompany the Journey directions.

With the completion of this and three Journeys on other subjects, children receive awards as Museum Travelers. Those who complete eight Journeys qualify as Museum Adventurers; twelve Journeys win them the title of Museum Explorers. Those who go on to the successful completion of 16 Journeys are eligible for a Special Journey which may admit them to a Museum Club.

ON THE TRAIL IN MUSEUM

Campfire Girls follow Museum Journey "travel" directions in quest of knowledge about giant plants.

Millions for Publications

Presently about 1,300 serial publications containing biological contributions are published in the United States (including Alaska and Hawaii), and Canada. It has been estimated that in 1954, 144,000 articles on biological topics were published throughout the world. It is quite likely that this number will be much larger for 1959. Considering present printing and production costs it can easily be computed that this involves a multimillion dollar business, not counting costs of the original research which led to the writing of these papers.

AUDUBON SCREEN-TOURS OFFERED AT MUSEUM

A series of six Sunday afternoon screen-tours will again be presented during the fall and winter in the James Simpson Theatre of the Museum under the auspices of the Illinois Audubon Society. The schedule of these lectures, accompanied by pictures in color, is as follows:

October 18—River of the Crying Bird
Allan D. Cruickshank

November 15—Designs for Survival
William Anderson

December 13—Adventures in Color With American Birds and Big Game
Cleveland P. Grant

January 17—Wild Europe
Roger Tory Peterson

February 21—Roanoke Northwest
G. Harrison Orians

March 20—Wildlife Down Under
Alfred M. Bailey

The opening program on October 18 tells the story of Florida's Wakulla River that flows south from a point just outside Tallahassee all the way to the Gulf of Mexico. The river's name comes from the Indians and means "mysterious water." Its course lies through a wilderness of cypress knees and moss-draped trees filmed in marvelous color by the lecturer, Allan Cruickshank. The region abounds in wondrous wildlife including the American egret, alligators, and the anhinga or snake-bird.

Seats in the reserved section of the Theatre are available to Members of the Museum, as well as members of the Illinois Audubon Society, on presentation of membership card in either organization. All the lectures begin at 2:30 P.M., and admission is free.

NATURE PHOTO ENTRIES WELCOMED NOW

Preparations are now under way for the Fifteenth Annual Chicago International Exhibition of Nature Photography, jointly sponsored by the Nature Camera Club of Chicago and the Museum. The exhibit will be held in the Museum from February 6 to 26. Photographers, both amateur and professional, are urged to send their entries early; the deadline will be January 18. It is expected that many vacation travelers will find pictures of animal life, plant life, and scenery on their travels that are worthy of submitting for this contest, which year after year has been the largest anywhere in the world devoted exclusively to nature subjects.

The Nature Camera Club will award medals and ribbons for prints and color slides selected by the judges either as best in their classifications or deserving of honorable mention. Additional special prizes will be awarded by the Photographic Society of America.

Contestants may submit up to four entries in each of two divisions: (1) prints, and (2) color slides. Prints may be either in black-and-white or in color. Each of the two divisions include three classifications: Animal Life, Plant Life, and General (scenery, clouds, geological formations and other natural phenomena). Upon request, the Museum will furnish entry forms and full information; entries should be mailed directly to the Museum.

Exhibit of Indian Art Extended to Oct. 28

The special exhibit, Indian Art of the Americas, originally scheduled to end September 28, has been extended to October 28. Included in the show, located in Stanley Field Hall, are selected art objects from the North, Central and South American collections of this and other leading museums. The material represents some 2,500 years of creative effort.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology

From: Jay Barrymore, Chicago—2 amulets, Egypt; Miss Alice MacKinlay, Chicago—Southwestern U. S. effigy pottery receptacle, Durango, Colo.; Charles E. MacNab, Chicago—34 projectile points and 4 scrapers, Saudi Arabia; Miss Katherine Pope (bequest of), Chicago—4 wooden bowls, Hawaiian Islands; Miss Sarah Smartz, Chicago—burial mat, Solomon Islands; Raymond Wielgus, Chicago—Budji *buruburu* drum, Papuan Gulf, New Guinea

Department of Botany

From: Dr. Leandro Aristeguieta, Caracas, Venezuela—herbarium specimen; H. R. Bennett, Chicago—730 phanerogams, Michigan and Wisconsin; Mrs. Dorothy Gibson, Chicago—52 vascular plants, Kentucky; Dr. Edward Nelson, Chicago—20 phanerogams, Sweden; Dr. Edward F. Webb, Skokie, Ill.—17 cryptogams, 77 phanerogams, Alaska

Department of Geology

From: Mrs. Faith E. Baldwin, Chicago—a locket with opals; Albert Nicholas, Chicago—amber, Danzig, Poland; Dr. E. S. Richardson, Libertyville, Ill.—5 fossil fish, 3 fossil plants; R. E. Wilmer, Aiken, S. C.—mineral, garnet chip

Department of Zoology

From: University of California, Los Angeles—2 fish paratypes, Mexico; Harry Hoogstraal, Cairo, Egypt—117 bird skins

MONTH'S ENROLLMENT OF NEW MEMBERS

(August 17 to September 15)

Non-Resident Life Member

Mrs. Philip Sidney Post

Associate Members

Dr. A. Allan Bates, Lee F. Biedermann, John R. Bradley, John A. Brandenburg, Cameron Brown, Mrs. Dorothy M. Burwell, Clifford B. Cox, Trevor L. Davies, Robert Dick, Henry X. Dietch, E. Ross Gamble, Dr. Stanford R. Gamm, James W. Gee, G. F. Gerk, Robert Hixon Glore, Andrew C. Graham, James J. Gregory, Herman Harris, Dr. Schuyler Dean Hoslett, E. Richard Kuehne, John G. Lambertsen, Arthur Lorentz, J. de Navarre Macomb, Jr., Dr. David Bremner Maher, Miss Margaret Mellody, Raymond Mostek, Charles F. Murphy, Arnold Newberger, Walter Nietschmann, Robert E. Potter, Jr., John H. Riley, Paul B. Shoemaker, Dr. Bruce A. Spooner, Dr. Hans von Leden, Allen B. Wilson, L. Ylvisaker

Annual Members

Bruce Adams, Norbert F. Armour, Robert S. Arnold, Miss Florence Harriett Bade, Dr. Thomas G. Baffes, Michol Baim, Edward Benningsen, Mrs. Lucille T. Blakesley, Robert Blumenfeld, Frank H. Bopp, Roy D. Bradley, J. L. Brazee, Gerald W. Brooks, Norman E. Bueter, Philip F. Casello, Mrs. Mitchell S. Corbett, Robert A. Crawford, Dr. Dominick A. Daniele, Leon M. Despres, William Dess, Fred W. Eckert, Mrs. Jerome Factor, Mrs. Edward W. Fahey, C. R. Freeman, Charles K. Goldberg, Benjamin E. Goodman, Mrs. Alice Goodrich, Leonard W. Gopp, William Haddow, William R. Hagedorn, Dr. J. M. Hajduk, John L. Hall, Daniel J. Hallahan, John Hehnke, H. L. Hendrickson, Matthew J. Hickey, Jr., B. J. Hoddinott, Fred K. Hoehler, Randall T. Holden, Eugene X. Humphrey, Miss Ruth Hunt, Arthur M. Jens, Jr., W. J. Jensen, Frank S. Kanelos, Mrs. Walter H. Knoebel, Saul Korshak, C. W. Kreuger, Richard W. Kritzer, Sr., Overton F. Kuhn, F. H. Kullman, Jr., Mrs. Ray W. Leonard, A. A. Lipsey, James E. Lowden, Miss Georgia A. Lynch, James McIntyre, Mrs. Daniel P. McMahon, Mrs. Ernest Noyes, Dr. Oscar B. Nugent, Dr. M. F. Ocasek, Klaus Ollendorff, John F. Parmer, W. H. Robinson, Ralph Rose, William D. Sampson, George J. Schaller, J. Herzl Segal, Thomas J. Sheehan, Earle A. Shilton, E. Courtney Sorrelle, F. L. Spreyer, Dr. Joseph Stagman, Robert B. Stitt, Frank C. Stover, William D. Sunter, C. R. Taaffe, Saul O. Tannenbaum, John Temple, Mrs. Ivan L. Tyler, Norman Ulrich, Mrs. Dan Unger, Dr. Charles S. Vil, Anthony P. Vincenti, Dr. Harold C. Voris, Dr. Maggie L. Walker, Dr. S. Y. Wang, Dr. Milan M. Wasick, Dr. J. Lewis Webb, Dr. Michael S. White, Dr. Jack Williams, Dr. Seymour D. Wishnick, Dr. Ernest S. Wolf, Dr. N. S. Zeitlin, Dr. Theodore N. Zekman

The spell of the Orient may be felt in a visit to the exhibits of ancient China (George T. and Frances Gaylord Smith Hall—Hall 24), Chinese jades (Hall 30), and modern China and Tibet (Hall 32).

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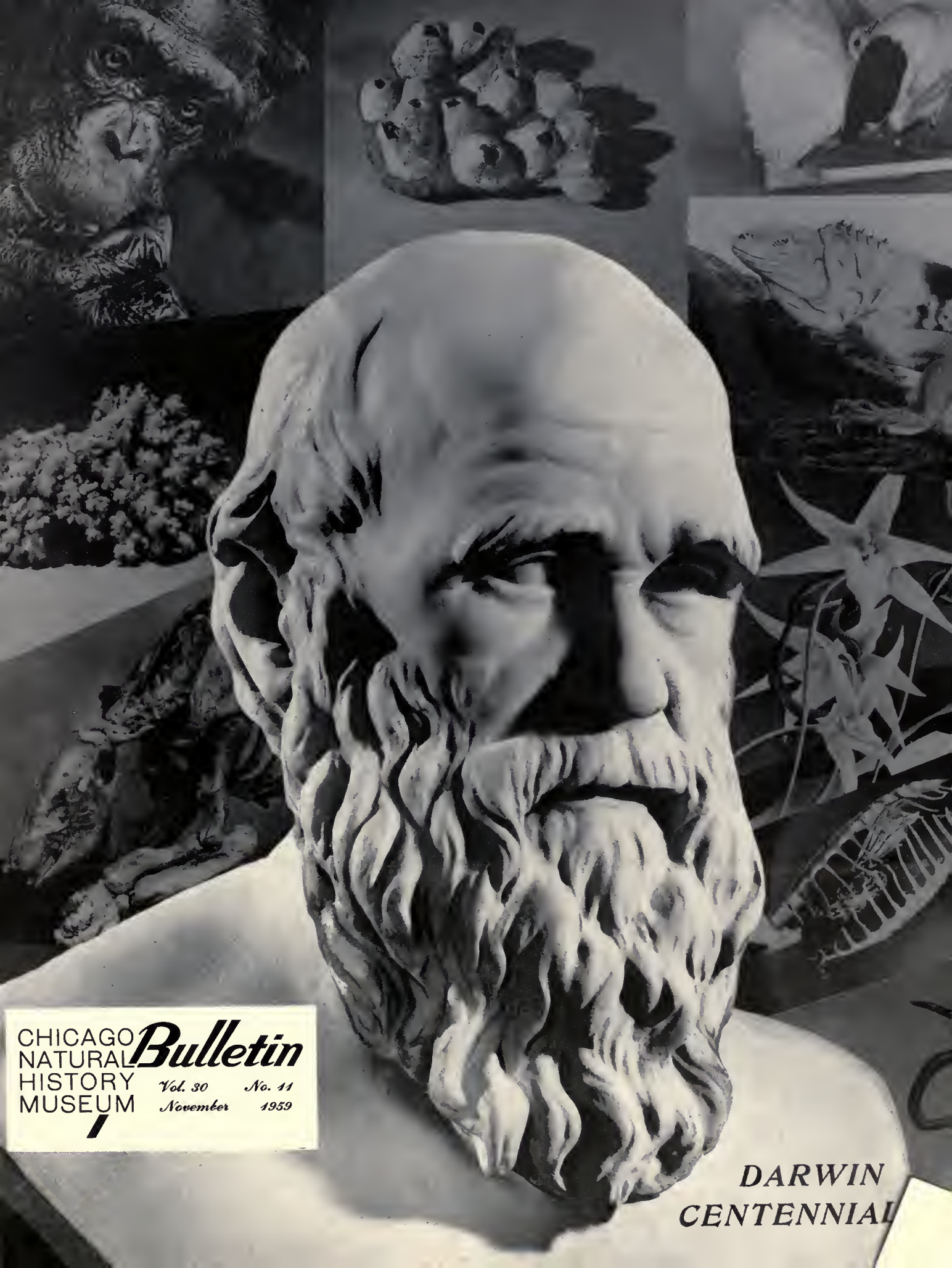

CHICAGO NATURAL HISTORY MUSEUM

Bulletin

Vol. 30 No. 11

November 1959

DARWIN CENTENNIAL

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WABASH 2-9410

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Members are requested to inform the Museum promptly of changes of address.

GIFT SUGGESTION

Chicago Natural History Museum offers an opportunity to thoughtful persons to share in the progress of scientific discovery through Membership in the Museum. Membership dues and contributions assist greatly in financing the Museum's research and educational work.

The recipient of a Museum Membership will receive the following:

(1) Free admission to the Museum for the Member, the Member's family and house guests.

(2) Reserved seats at all lectures and film presentations.

(3) Use of the Museum's excellent library for information and study.

(4) The Museum's monthly BULLETIN and the *Annual Report of the Director*. Certain other Museum publications issued during the term of Membership will be sent upon written request.

(5) Special discount privileges at the Museum's Book Shop, which carries carefully selected books on the natural sciences and an outstanding collection of items suitable for gifts. Children's books are a feature.

Life and Associate Members are exempt from payment of dues (the fees are deductible for federal income tax purposes). Fees from these Memberships are permanently invested and only the income is used for budget purposes. Increasing the endowments provides one of the best means of assuring the growth of this institution.

MEMBERSHIPS

Annual	$ 10.
Sustaining (annually for six years)	$ 25.
Associate	$100.
Non-Resident Associate	$ 50.
Life	$500.
Non-Resident Life	$100.

For information, write to the Director of the Museum, or telephone WAbash 2-9076.

PIGEONS' FLIGHT VIEWED WITH FRIGHT

We have received from Carl S. Miner, a Chicago consulting chemist and Associate Member of the Museum, the following amusing jingle inspired by the article "Pity Poor Pigeon: Host to a Community," by Dr. Austin L. Rand, Chief Curator of Zoology (BULLETIN, August, 1959, page 6):

Till now when I saw pigeons fly
Away up yonder in the sky
I much enjoyed their graceful motion.
Then I had not the slightest notion
That they were hosts to noxious things
That crawl or creep or fly on wings.
Now when I see them overhead
I'm filled with fear, also with dread,
Of what might happen. So in fright
I pull my hat down very tight.
Knowledge is power, but sometimes it
Limits enjoyment quite a bit.

Winter Visiting Hours Begin

Effective November 1, visiting hours at the Museum will be 9 A.M. to 4 P.M. (5 P.M. on Saturdays and Sundays). This schedule will prevail through February 28.

Off-Calendar Birds

The egg-laying calendar of the sooty terns of Ascension Island, near the equator in mid-South Atlantic, is unique in the bird world. The records now extend from 1941 to 1958, and the birds are known to breed every 9.7 months, instead of every 12 months as is the rule for other birds.

The seas surrounding Ascension are evidently rich in food for the birds the year 'round, so they could breed any time. Why they should do so every 9.7 months (practically every 10 lunar months) is a mystery.

Auk, 1959

Some of the earliest tools made by man are available to researchers in the study collection of the Department of Anthropology.

THIS MONTH'S COVER

Charles Darwin was a prolific author. In addition to the "Origin of Species" he wrote more than a dozen books in the fields of botany, geology, and zoology. Our cover, designed by Assistant Photographer Homer V. Holdren and Staff Artist E. John Pfiffner, shows Darwin against a background symbolizing the themes of the most important of his books.

LECTURES FOR ADULTS DURING NOVEMBER

The final four lectures on science and travel in the autumn series will be given on Saturday afternoons at 2:30 in the James Simpson Theatre of the Museum. All of the lectures are illustrated with color motion pictures. Provided by the Edward E. Ayer Lecture Foundation, the programs are free to all Museum visitors. Members of the Museum may obtain reserved seats by presenting their membership cards before 2:25 P.M. on the chosen lecture day.

Following is the November schedule:

November 7—Scotland
Nicol Smith

November 14—Probing Antarctica
Finn Ronne, USNR

November 21—Patagonia
Malcolm Miller

November 28—Japan
Gordon Palmquist

EXPLORING ANTARCTICA AREA

Members of International Geophysical Year expedition make helicopter flight around mass of ice in Weddell Sea. From Captain Finn Ronne's film, to be shown on November 14.

CENTENNIAL OF DARWIN'S 'ORIGIN OF SPECIES' HAILED

By D. DWIGHT DAVIS
CURATOR OF VERTEBRATE ANATOMY

CHARLES DARWIN'S celebrated book, *The Origin of Species by Means of Natural Selection*, was published just a hundred years ago, on November 24, 1859. Few ideas affected the whole fabric of human thought so profoundly as the idea Darwin was trying to prove, that species of animals and plants were not created fixed and immutable. In a very real sense the publication of the *Origin* marked the end of an era that goes back to the beginning of recorded human thought, and the dawn of a new era whose consequences we cannot even dimly discern. For the first time man saw himself standing alone in a universe he had scarcely begun to understand. The prospect was terrifying. It is impossible for us today to appreciate the intensity of feeling, the outraged indignation, the emotional panic, with which Darwin's ideas were greeted by many, including many of his fellow scientists. Yet this reaction might have been foreseen (and was indeed foreseen by Darwin himself), for nothing before or since has so humbled man as did the implication that he is kin to the rest of nature. The last serious attempt to demolish this concept by an appeal to irrational emotion was the Scopes trial held in Dayton, Tennessee, in 1925.

A hundred years is enough time to provide some historical perspective, and biologists and humanists the world over are seizing the centennial anniversary of the publication of the *Origin* to assess its status today, and to appraise our present understanding of evolution in general.

Historical research has clarified Darwin's place in the history of man's attempt to understand nature and himself. It has long been clear that Darwin did not originate the idea of evolution, and that he did not prove that evolution took place. Nowhere does he claim to have done so. The idea that species are related through common ancestry is an old one that cannot be attributed to any one man. That evolution did in fact take place can be proved in only one way—by seeing the actual record of evolutionary change in the rocks laid down while these events were happening. If there were no fossil record biologists would still be debating the fact of evolution.

DARWIN'S FORERUNNERS

Darwin did not even originate the idea of natural selection, the concept most intimately associated with his name. His grandfather, Erasmus Darwin, himself a most remarkable man, came close to hitting upon the idea of natural selection in 1794. Recent historical research has unearthed an astonishing number of books and articles written in England during the first half of the 19th century that explicitly attribute the creative role in evolution to natural selection. Most of these are nearly forgotten now, but some were immensely popular in their time, and all were certainly well known to Darwin.

Conspicuous among these pioneers were William Lawrence, a physician, Edward Blyth, a naturalist, and the philosopher Herbert Spencer. Spencer even coined the historic phrases "struggle for existence" and "survival of the fittest," which are often attributed to Darwin. Finally, the young Alfred Russel Wallace, who for years had been collecting and observing animals in the tropical jungles of the East Indies, in 1858 sent Darwin a draft of a theory of evolution by natural selection so similar to Darwin's that Darwin wrote in astonishment and dismay, "I never saw a more striking coincidence." Only now are we beginning to appreciate the extent to which evolutionary thought was working, like yeast, in the minds of Englishmen during the early 19th century. In England the idea of evolution was no philosophical plaything, but a bold attempt to understand the workings of nature in terms of known forces.

Seemingly "scooped" by others on every point, we may well ask why Darwin is celebrated, and why the *Origin* is considered one of the handful of great books that have profoundly influenced humanity. In part the explanation is simple. Except for Wallace, the notions of Darwin's predecessors were not scientific theories but speculations unsupported by facts. The history of philosophy is full of such flights of fancy, which may be stimulating and inspirational but do not represent any real advance in understanding. Wallace's claims are not so easily disposed of, for his explanation of evolution was arrived at exactly as Darwin's was—through deduction from an enormous mass of observations. It was Wallace's misfortune to be far away in the jungles of the East Indies when the storm broke in England. If he had returned to England earlier he might not have been eclipsed so completely by Darwin. Yet we cannot imagine the brilliant but erratic Wallace compiling the *Origin*. It was the overwhelming mass of data painstakingly marshaled by Darwin in the *Origin* that forced a reluctant humanity to abandon its belief in special creation, the most powerful superstitition that ever enslaved the mind of man. Perhaps the most important ingredient in Darwin's genius was the tenacity that kept him patiently gathering and sorting data for twenty-five years.

It was probably inevitable that some would try to deify Darwin as a unique genius whose insight enabled him to peer into the void and see what no man before him had dreamed of. There have been such men in the history of science, but Darwin certainly was not one of them. Nothing in history is more certain than that sometime during the third quarter of the 19th century some British biologist would have written an "origin of species by means of natural selection." Scientific knowledge in general, particularly in geology and paleontology, had reached a level that was making it impossible for any fair-minded person who knew the facts to doubt that evolution did take place. In England the medieval stranglehold of the church on the minds of men had relaxed enough to make it safe to express such opinions publicly. And for more than fifty years influential British scholars had been suggesting—but without any proof—that natural selection is the agent of evolution.

MILESTONE IN HUMAN THOUGHT

The fact that Darwin and Wallace independently developed identical theories at the same time was no accident. In all fairness we must recognize that Darwin was something of a child of fortune, who happened to be at the right place at the right time. It is not quite correct to say that Darwin and the *Origin* altered the course of human thought; rather they are symbols of an important milestone in the evolution of human thought. Yet such an appraisal of Darwin's place in history would be grossly unfair, for it *was* Darwin who wrote the *Origin of Species*, and it *was* the *Origin* that breached the last bulwark of romantic idealism in science. To argue that another might have done it is fatuous. Darwin was far more than a mere plaything of fate, but there is no need to make more of him, or of the book, than they were.

What, then, is the status of natural selection as a scientific theory today? No one can question its historical importance, but in science no concept has standing merely because it once caused a stir, however great. The only test of a scientific theory is whether it continues to account for all new facts as they are discovered. If it does not, the theory is dead and only historians continue to study its corpse.

Natural selection has had its times of trouble when new observations, particularly in paleontology and genetics, seemed to doom it, but it has survived all such temporary misinterpretations. By far the most serious defect in Darwin's argument was the supposition, then general among animal breeders, that the characters of the parents blend in their offspring, like inks of different colors poured together. Discerning critics quickly pointed out that a favorable variation would therefore quickly be diluted and lost, so natural selection could not possibly work. Knowing that artificial selection does work, Darwin wrestled with this problem for years, and lost because the laws of heredity were then unknown. When Mendel's experim ents revealing the laws of hered ity were rediscovered in 1900 the difficulty disappeared, but by then Darwin had been

dead for eighteen years. Today natural selection is more firmly entrenched than ever —one of the foundation stones of our interpretation of living nature. Yet, like any theory in science, it will always be a provisional explanation. It will ever be tested against new observations and experiments, and the moment a discrepancy appears the theory will either be modified or abandoned. There is no place for sentiment in science.

Charles Darwin was a naturalist. Nature is so vast and complex that we are forced to study it by isolating tiny fragments in the laboratory, where each is worked on by a specialist. Such dismemberment may lead to grievously wrong interpretations of nature, and so someone must try to put these fragments back together and view nature as an organized whole. This is the job of the naturalist. Like nearly all naturalists of his time, Darwin was an amateur. Things have become vastly more complex since Darwin's time, and no longer can the amateur command the materials and equipment for carrying on biological research.

CAUTION ALWAYS ESSENTIAL

The naturalists of today are mostly in the world's few great natural history museums, where the tradition of working in the final great laboratory of nature itself is still carried on. This is a proper and necessary function, for biologists, like Antaeus, are strong only as long as their feet touch the ground. Specialists we must have, but it is all too easy to mistake a tiny fragment of nature, isolated in a man-made laboratory, for all of nature and reach catastrophically wrong conclusions. Naturalists may never again discover anything half so important as natural selection, but they will always be science's link with the firm ground of nature from which all science is drawn. Providing this vital link with reality is one of the most important functions of a natural history museum.

As one of the heirs of the Darwinian tradition, it is fitting for Chicago Natural History Museum to join in commemorating the centenary of the publication of the *Origin of Species*. A special exhibit, titled "Darwin's Origin of the Species," will be on display in Stanley Field Hall during the months of November and December. The exhibit consists of six panels that trace the history of the *Origin* and explain the meaning of, and the evidence for, natural selection. Included in the exhibit is a copy of the rare first edition of the *Origin of Species*, loaned for the occasion by the John Crerar Library of Chicago. Holograph letters written by Darwin and specimens from the Museum's collections that were collected by him on the voyage of the *Beagle* will also be on display.

One of the world's outstanding gem collections may be seen in H.N. Higinbotham Hall (Hall 31).

A SPECIAL EXHIBIT OF DARWINIANA

AT A TIME when scholars from all over the world are gathering on the University of Chicago campus to discuss the meaning and modern-day implications of Charles Darwin's *The Origin of Species*, a book that shook the world when it was first printed, and when numerous learned societies are publishing essays discussing that same book, Chicago Natural History Museum is bringing to the public a special graphic exhibit on this subject.

The special exhibit, titled "Darwin's Origin of Species," commemorates the first publication of the theory on November 24, 1859, and will go on display in Stanley Field Hall November 1, continuing through December 31.

Six panels tell the story of *Origin* by explaining the meaning of, and the evidence for, natural selection—the book's theory that in the "struggle for existence" those characteristics will be retained that best enable an organism to cope with life and to survive. The first panel traces the historic voyage of the *Beagle* on a colored map of the world, focusing on specimens that Darwin collected and studied at different points of the voyage. It was on that voyage that Darwin formulated many of his first ideas regarding evolution. Panel 2 presents the logical development of Darwin's ideas that came out of the voyage, in the areas of paleontology, embryology, and comparative anatomy. The third panel is devoted to the numerous books that Darwin wrote before and after publication of *Origin*, each concentrating on a different area of life, but all influenced by his theory of evolution.

EXAMPLES OF PROCESSES

More explicit examples of the basic thinking involved in natural selection, as Darwin saw it, are embodied in Panels 4, 5, and 6. Three examples of the operation of natural selection are shown in Panel 4: oak leaves, beetles, and variations in domestic pigeons. Panel 5 pictorially demonstrates six forces that play a part in natural selection: disease, competition, food, co-operation, climate, enemies. Finally, Panel 6 shows how a species produces progeny in excess of those that will ultimately survive to assure continuity of the species—a point in which Darwin became interested after reading *Malthus On Population*. To demonstrate this point, the panel shows Darwin's classic example of the possible geometric increase of two elephants over a period of 750 years to 19 million elephants—the number that would roam the earth in the event that none of the elephant offspring died or were killed after birth.

Responsible for planning the exhibit are Dr. Austin L. Rand, Chief Curator of Zoology, D. Dwight Davis, Curator of Vertebrate Anatomy, and E. John Pfiffner, Museum Staff Artist.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons by advance request.

FILMS FOR CHILDREN ON SATURDAYS

The autumn series of free motion pictures for children continues in November with programs to be presented on each of the four Saturday mornings at 10:30 A.M. in the James Simpson Theatre. Children may come all alone, in organized groups, or accompanied by adults. No tickets are needed.

Dates and titles of films are as follows:

November 7—The Magic Horse

An animated cartoon based on the old Russian folk tale about a boy and his tiny horse that has magical powers

November 14—The Adventures of Chico

A children's favorite: the story of a little boy and his pet bird in Mexico

November 21—Kon Tiki (*Museum Traveler Day—presentation of awards to children who have completed series of Museum Journeys*)

The voyage of a group of young Scandinavians from South America to Pacific islands on a balsa raft

November 28—An All-Cartoon Program

Willy, the Operatic Whale; Susie, the Blue Koop; and A Cowboy Meets a Horse

Each boy and girl attending will be given an exploration sheet directing them to Museum exhibits in which they can see material related to the stories of the films.

Educational Toy

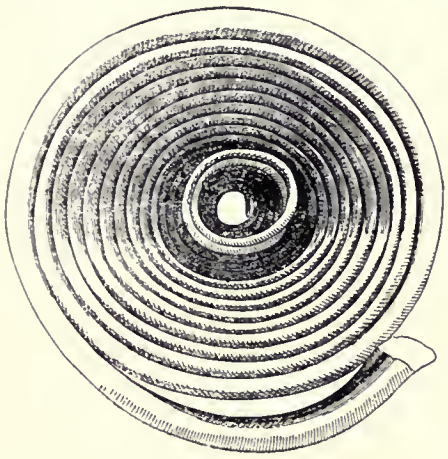
"Pancho," the Grasshopper, currently on sale in the Museum's Book Shop is a recent addition to the line of scientific toys. The accurate reproduction of the grasshopper was made possible by the assistance of Henry S. Dybas, Associate Curator of Insects, and by specimens supplied the manufacturer by this Museum's Division of Insects.

Molded in plastic in natural colors, "Pancho" is an excellent introduction to the study of insects. Because of its enlarged size, 12 inches in length, children can easily observe details of the grasshopper and come to better understand how this insect lives.

DARWIN, AN ORCHID, AND A MOTH

By THEODOR JUST
CHIEF CURATOR OF BOTANY

IN THE PREFACE to the second edition of his book, entitled *The Various Contrivances by Which Orchids are Fertilized by Insects* (1877), Charles Darwin pointed out that "during the two or three years after its appearance" (1862) he received "through the kindness of various correspondents in different parts of the world, a large number of letters, especially from Fritz Müller in South Brazil, communicating to me many new and curious facts." One of these communications concerned the Madagascar epiphytic orchid, *Angraecum sesquipedale*, whose flowers have



Courtesy of Nature Magazine

PROBOSCIS OF SPHINX MOTH

Used in pollination. (Drawing by Fritz Muller)

spurs one foot long or more, which contain nectar. Pollination of these flowers "must depend on some gigantic moth," as Darwin predicted.

The June 12, 1873 issue of *Nature* (A Weekly Illustrated Journal of Science) contains a request for information concerning this orchid by W. A. Forbes. Promptly, Hermann Müller sent a reply published in the July 17, 1873 issue of the same journal, under the title of "Probosces Capable of Sucking the Nectar of Angraecum sesquipedale." In this reply, Hermann Müller reported the findings of his brother, Fritz Müller, in Brazil concerning a sphinx moth with a proboscis of "about 0.25 metres." The above illustration shows this proboscis "in its contorted condition" with "at least 20 elegant windings."

In the January 31, 1907 issue of *Nature*, E. W. Swanton asked once more for the name of the moth that could pollinate this orchid. In reply, Alfred Russel Wallace, co-discoverer of natural selection, stated that he had "not heard of any moth from Madagascar with an exceptionally long proboscis," but that he had heard "of one from East Africa with a proboscis the length required." He did not realize how close to the truth he had come. In March of 1903 Walter Rothschild and Karl Jordan published their "Revision of the Lepidopterous Family Sphingidae" which contains the description of a new genus, *Xanthopan*, whose single species, *morgani*, occurs in Africa as expected by Wallace. Included in the revision is also the description of a new subspecies, *praedicta*. This name indicates that the long expected discovery was made, for it was found that this subspecies occurs only in Madagascar and that its tongue "is long enough—about 225 mm. (8 inches)—to reach the honey in short and medium-sized nectaries of Angraecum." As even the longest spurs fill up to "one-fourth of the nectary," this subspecies apparently can reach nectar in these flowers.

Inasmuch as Wallace missed the information published in his country, it should not surprise us that the bulk of the pertinent botanical and entomological literature failed to pick up this name and description and transmit them to their readers. It seems particularly appropriate to call attention to *Xanthopan morgani praedicta* at this time in the hope of filling this vacuum forever.

Angraecum sesquipedale is "so far the finest of the species" of this genus of more than 100 kinds of epiphytic orchids, many of which are grown in greenhouses. A model of this species, made in the Museum's Plant Reproduction Laboratories, is a permanent exhibit in the Hall of Plant Life (Hall 29—Martin A. and Carrie Ryerson Hall), but presently is on display in the temporary Darwin exhibit.

I am greatly obliged to Rupert Wenzel, Curator of Insects, for his assistance with the entomological literature.

2 'KNOW-YOUR-CHICAGO' GROUPS VISIT MUSEUM

Two groups of about 100 persons each visited selected exhibits in the American Indian halls at the Museum on September 29 and 30 on field trips conducted by University College of the University of Chicago in correlation with its series of "Know Your Chicago" lectures now in its eleventh year. As part of a study of the subject "Great Cities of the Past," the visitors were conducted to such exhibits as the dioramas of an Inca village in Peru, a Maya village, a market in ancient Mexico City, and the special exhibit "Indian Art of the Americas." Dr. Donald Collier, Curator of South American Archaeology and Ethnology, addressed them in the Lecture Hall before the Museum tour. Staff lecturers of the Raymond Foundation assisted in conducting the tours. Mrs. Laurence Carton, Mrs. Snelling S. Robinson, and Mrs. William Bowe were tour leaders for the Know Your Chicago organization.

Mineral resources of the state of Illinois are featured in an exhibit in Hall 36.

PRIMITIVE ART LECTURE OFFERED AT MUSEUM

The exotic art of Western (Dutch) New Guinea will be explored in a lecture in James Simpson Theatre of the Museum on Friday evening, November 6, at 8:15. Dr. Simon Kooijman, anthropologist, Curator of the National Museum of Ethnology in Leiden, The Netherlands, and an authority on New Guinea art, will present an illustrated lecture entitled, "The Art of Western New Guinea and its Cultural Background." Dr. Kooijman is the author of *The Art of Lake Sentani*, the first monograph on primitive art published by the new Museum of Primitime Art in New York. During Dr. Kooijman's visit to the United States he will lecture at the Museum of Primitive Art in connection with its current exhibition, The Art of Lake Sentani. He also will travel within the United States to inspect important collections of New Guinea art. As part of his visit to Chicago Natural History Museum, Dr. Kooijman has kindly consented to lecture to the members and friends of the Museum.

Dr. Kooijman's lecture will deal with an aspect of primitive art not stressed enough, the relationship of the art to its cultural background. He is extremely well qualified to deal with art in such terms—having studied both the art objects in museums and also the people who made them in New Guinea.

Chicago Natural History Museum and the Department of Anthropology of the University of Chicago are jointly sponsoring the lecture at the Museum. Admission will be free. Museum Members and friends are urged to use this opportunity to hear a distinguished authority on primitive art.

'DESIGNS FOR SURVIVAL' NEXT AUDUBON TOPIC

This month's Sunday afternoon screen-tour of the Illinois Audubon Society is "Designs for Survival," to be presented on November 15 at 2:30 P.M. in the James Simpson Theatre by William Anderson. In his color film and talk, Anderson will show phases of the life of many animals from insects and fishes to birds and mammals illustrating how nature adapts them to meet environmental conditions and to compete against inimical forces for the survival of their species.

Admission is free. Museum Members and their guests are cordially invited to attend.

Another Audubon screen-tour, "Adventures in Color With American Birds and Big Game," by Cleveland P. Grant will be presented on December 13.

Now approaching a total of 7,000, the Museum's membership has reached the highest figure in the institution's history.

MYSTERY OF HANDWRITING ON THE WALL IN SOUTHWEST

By PAUL S. MARTIN
CHIEF CURATOR OF ANTHROPOLOGY

FOR the past four months my colleagues and I have been digging in the ruin of a prehistoric apartment house that we found in Arizona, on the east bank of the Little Colorado River on the ranch of Robert Hooper of Springerville. At first sight the ruin resembled a small hill. Scattered on its surface were fragments of pottery and stone tools, and pieces of dressed stone that were remnants of the ancient walls.

We started to dig in the top at the middle of the hill to keep ourselves from being "painted into a corner," so to speak. By working from the middle rooms outward, we could carry the dirt and rocks in wheelbarrows over the filled-up rooms. We probably removed about two million pounds of dirt and rock or about 1,000 tons. Since we could not afford to excavate the entire site, we dug two tiers of rooms at right angles to one another. One tier was an east-west section, the other a north-south one. The two rows of rooms, excavated at right angles through the site, probably gave a fair sample of the contents of the ancient building and its architectural complexities. We discovered numerous tools of stone and bone, and 10,000 potsherds which we washed, counted, and classified.

The building was occupied about 650 years ago (A.D. 1300–1325). This date is only an estimate, based on the types of pottery we found, and their resemblance to other kinds that have been discovered and dated. A few families probably settled in this fertile valley because of the abundance of water and the profusion of wild life. Here they could have hunted and farmed easily; and the ability to farm was important, for farming was their basic industry.

ROOMS FREQUENTLY ADDED

At first the pueblo was probably a one-story building with ten or fifteen rooms, all exceedingly well-built. Rooms were added from time to time, as the families grew in size. Families increased rapidly among these people because it was customary for the daughters to bring their husbands home to live in the mother's dwelling-place.

At least ten sealed doorways were found—all in the rooms on the ground floor. Some of the sealed doors opened into other apartments and some of them led to the outside. Why were these doors sealed? Did marauders so often molest the family that an unscalable wall and an entrance through the roof seemed safer? Or did the river overflow and flood their rooms? We know that the river overflowed at times, for we found river gravels and silt just below the refuse. Sealing the doorways would have kept out the floods.

Shortly after the doorways were plugged, another architectural change occurred. The ground-floor rooms were all filled with dirt and rocks, the walls were cut off at the top, and the roofs were ripped off. Then new rooms were built on this fill, which was four or five feet above the ground-floor levels. The walls of the upper rooms do not coincide with the earlier, lower walls. The lower rooms were filled up, but the new walls criss-cross the old ones. One wall carried straight up from bottom to top would have been stronger, but the new, late walls were built on soft, shifting earth and must have been very unstable. Apparently, the people who built the upper rooms had resolved to pay no attention to the earlier floor plan — they wanted a pueblo that was completely different from the earlier building in both organization and arrangement. We know of few, if any, similar ruins in the Southwest. Why?

POTTERY CHANGED SLOWLY

Did the original inhabitants flee from their homes after fighting floods? And did another group of Indians find the deserted pueblo, decide to revamp it to suit their needs and their style, and to rebuild it with their makeshift masonry? I would gladly accept this apparently logical explanation, if the pottery and tools reflected any abrupt change in workmanship. Instead, we have traced a slow continuous trend from the earlier types to the later. The amount of black-on-white pottery decreased and gradually more polychrome and glaze appeared. Also, there is no great difference in time between the earlier and the later types. The earliest would date at about A.D. 1300 and the latest at about 1350–1375. The stone and bone tools show the same slow change. I am unwilling to relinquish the "Replacement Hypothesis," but I must say I have little evidence to support it.

In many of the rooms designs were inscribed on the walls. Some of these pictographs—the geometric designs—had been incised, probably with a bone tool. Others, resembling men, mythical birds and other animals, had been pecked into the soft sandstone walls, probably with a hammerstone. The significance of these figures is a mystery, but I think it is fair to say that they were not the work of some prehistoric "beatnik." They probably were associated with hunting rites or other religious rituals. However, they are among the few pictographs in the Southwest that can be associated with a certain people and that can be dated. Most of those found in the area have been drawn on the rock walls of canyons or on boulders, and so are difficult to ascribe to any certain people or date.

As told in the September BULLETIN, we also found traces of the Katchina Cult in the pueblo. The Katchinas were supernatural beings who could bring rain and could aid the people in many other ways. Katchinas were often impersonated by men wearing masks and elaborate costumes.

THREE KIVAS FOUND

In the pueblo we found three kivas. Kivas were sacred underground chambers used by men, where rituals were conducted. We excavated two kivas, one of which was rectangular, with a platform at one end. A tunnel permitted fresh air to flow by gravity into the room—an early example of ventilating apparatus. The other kiva was smaller (perhaps 8 by 10 feet), and its floor was paved with large flagstones. A small ventilator tunnel and a round chimney-like shaft furnished fresh air to the occupants of this kiva. The largest kiva was not excavated this season.

Three other projects were completed during our field season. On one site, where we worked last year, we excavated a Great Kiva —a round one—which contained several bur-

The drawings heading this page represent a selection of petroglyphs from the walls of the pueblo excavated by the Southwest Archaeological Expedition during its 1959 season. A few of the figures are readily identified as men, a snake, and other animals. (Drawings by Gustaf Dalstrom, Artist in the Department of Anthropology.)

ials. This site should probably be dated about A.D. 1000 to 1100.

We also searched for other archaeological sites within an area of about 300 square miles. This work was done both by car and on foot. The sites thus found and recorded this season date from about 1500 B.C. to A.D. 1400—a span of almost 3,000 years. Two caves were found during this survey, one of which was excavated. The cave had been occupied sporadically for short periods of time, perhaps by hunters and traders, from the 8th century to the 15th.

Our primary interest this summer was to bridge certain gaps in the chronology of Mogollon-Zuni history. Last summer we excavated a pre-Zuni (Late Mogollon) site, the date of which, about A.D. 1350, was fixed by radiocarbon and tree-ring dating. These three sites excavated this summer have been dated from A.D. 700 to about 1350, and these sequences join neatly with our researches in western New Mexico. But there are still many gaps in the chronology—mainly the centuries before A.D. 1000.

Our work is cumulative, for we find that the research of each season gives us more insight into the problems produced by the work of previous years. We continue to accumulate information on how men solved their problems in the past; how they conquered some obstacles and were overcome by

(*Continued on page 11, column 3*)

ON THE 'DIG' IN ARIZONA—Southwest Archaeological Expedition, 1959. (1) View of progress in excavation of kiva or ceremonial chamber. (2) Martin Hoffman, a student-worker, points to pictographs on wall and tries to decide whether these works of art were the creation of a prehistoric abstractionist or a primordial "beatnik." In foreground is a firepit of the ancient Indians. (3) Margaret Alder, another student-worker, cleans off burial objects with whiskbroom, trowel and camel's-hair brush. Shown is one of the finds, a seed jar nested in a bowl. The burial, that of a woman, is in an abandoned kiva and dates to about A.D. 1000. (4) General view of the pueblo, principal site of this year's excavation. Members of digging crew standing in rooms provide a key to scale size of site. (5) Miscellaneous small tools recovered by diggers. At top is leg-bone of a large animal from which rings (center, right) are cut. At sides of photograph are bone awls; in center is portion of a bracelet made from shell received in trade from Indians on Gulf of California, and arrowheads.

'DARKEST AFRICA' TRULY IS GLARINGLY BRIGHT

By ROBERT F. INGER
CURATOR OF AMPHIBIANS AND REPTILES

AFTER three and one-half months in Africa, it is difficult to say what is the most impressive aspect of that great continent. Perhaps the first thing to say is that Africa is the bright continent rather than the dark one, for in its vast tropical belt the sun has a glaring brilliancy that seems to press a man's eyeballs into his skull. Even wearing a broad-brimmed hat and sun-glasses does not protect against the intense light of the mid-day sun.

The great density of the human population is, if anything, more astounding than the force of the sun. We thought that Africa would be full of wide open spaces, but our impression is that it is full of people. Our plane from Europe to Leopoldville in the Belgian Congo touched down in Kano, northern Nigeria, to refuel. From 5,000 feet above that semi-arid region, we could see at least as many evidences of human habitation as one might see from a similar altitude above northern Illinois.

In the Belgian Congo people were swarming everywhere. Riding in a jeep along one of the many dirt roads, we would often say to ourselves, "Ah, now we are really out in the wild bush." And then we would round a turn to see a cluster of grass huts and half a dozen shouting, laughing children jumping up and down in front of a few banana trees and waving at us with great delight. Or if no huts were visible, we would see a man on a bicycle, or a woman wrapped in brilliantly colored calico walking gracefully along the road.

FIELD WORK BEGINS

However, we went to Africa on a zoological mission—"we" being my wife and myself. The Institut des Parcs Nationaux du Congo Belge had asked me to study a large collection of frogs and toads from the Parc National de la Garamba, which is in the extreme northeastern part of the Belgian Congo. It was in connection with that study that we undertook the field work.

The Parc National de la Garamba is one of four national parks in the Belgian Congo. Its 1,250,000 acres (roughly twice the size of Rhode Island) lie in savanna, a tropical grassland in which the spacing of trees varies from widely scattered to almost contiguous. The landscape is not as spectacular as, say, the Colorado Rockies or the Swiss Alps. But the gently undulating hills that seem to go on forever create a powerful impression. With the change of season from dry to wet, the grasses and, therefore, the entire countryside change from straw color to rich, deep green. To sit on a rise and look across the rolling landscape, to see the contrast between patches of young and dead grass, and to watch a group of dark cape buffalo or a herd of red hartebeest grazing gives a quiet satisfaction that is not easily forgotten.

The park was given its particular location in order to protect the last Congo populations of giraffe and white rhino. Although the increase in the number of white rhinos progresses slowly, the giraffes have been a great success. We did not make a census, but we estimate that we saw giraffes three to five hundred times in our three months. For some reason it is difficult to watch giraffes moving without laughing. At least it was impossible for our native assistants to watch them without laughter, in which I admit we participated. Despite the fact that we saw giraffes every day, we could not get over the feeling that this must surely be the most improbable animal in the world.

ABUNDANCE OF ELEPHANTS

We saw elephants every day too. Elephants are extremely abundant in the Garamba, perhaps too numerous, for there are signs that they are destroying the range in places. On one occasion while riding in a jeep, we spotted a herd numbering 150 to 300. I cannot distinguish between 150 and 200 or 300 elephants. But from the size of the mass, the clouds of dust, and the length of time they took to pass, there must have been many more than 100. Futoyo, my principal native assistant, who has worked in the Garamba for more than ten years and who knows the mammals and their habits very well, estimated the herd at 500. That was an over-estimate, but herds that size have been seen before in the Garamba.

There is something satisfyingly solid about an elephant. It is not just its size—its shape and the quiet, dignified manner in which it moves across the savanna also have a lot to do with that impression. Sometimes, however, its dignity evaporates. One morning the men and I were caught by a sudden, heavy rainstorm and took shelter under a clump of trees growing along a creek. We had seen three elephants about 250 yards away on the other side of the stream before the rain began, but had paid as little attention to them as they had to us. Then we discovered that they, too, wanted to take shelter under "our" trees. Slowly flapping their ears and swinging their trunks, they came closer and closer as though oblivious of us. When they were about fifty feet away, Futoyo shouted, "Hey! Where you going?" (In Lingala, not English.) The elephants wheeled and shot off in the opposite direction, trunks up and tails streaming, followed by gales of laughter.

The black rhinoceros, the second African species, also lives in the Garamba, making the park one of the few places where both it and the white rhino occur. Rhinos are not as numerous in the Garamba as are the other large mammals, but we saw them often. To round a sharp curve in the track and suddenly to see a rhino scarcely thirty feet away is a marvelous experience. Shaped like huge bricks and set close to the ground, the rhinos left us with an impression of massiveness that we never got from elephants.

LIONS AVOID PEOPLE

Unlike some other famous African parks, the Garamba has never been open to tourists. As a result, in the Garamba the lions are not accustomed to people and definitely do not lie around in the open unconcernedly as cars drive by. Quite the contrary. They are not often seen—we saw them only twice—but they can be heard every night. When they are surprised in the open, they snarl and head for other places in a hurry. Cape buffalo, water buck, hartebeest, roan antelope, and several small kinds of antelope are common in the Garamba and each species adds to the interest of the park.

In fact there were so many interesting creatures—birds, ants, termites, grasshoppers, and dung beetles, to name just a few—that we often had to remind ourselves that our three months in the Garamba were to be devoted to amphibians. The frogs of any tropical region are varied and numerous; we collected roughly thirty species and probably overlooked five to ten others. These species occupy a variety of habitats. Many live only in the large permanent marshes. Others live only in narrow, densely-wooded ravines that mark the courses of certain small streams. Still others are found throughout the savanna. Some spend all of their lives in water, whereas others climb up the papyrus and reeds of the marshes, and some hop across the ground. There are tiny species, literally no larger than your small fingernail, and large species, the size of our bullfrog. The coloration of certain species was quite handsome. One tree-frog had a dark brown back that was spotted with red, a white abdomen, a lemon-yellow throat, and red legs. Several species were bright grassy-green and one had a gold stripe on each side.

Unfortunately these beautiful colors fade when the frogs are preserved. And many had to be preserved. One hundred years ago man's ignorance was so colossal that the main purpose of most zoological field work was simply to collect so that we might learn what animals lived in the various regions. Now we have a rough answer to that problem, and field zoology is directed increasingly to the study of the ways in which the animals live and how their lives are interwoven. One of the primary goals of our field work was to obtain detailed habitat information on each species of frog in order to determine ultimately the spatial relationships of the entire fauna. In effect we asked ourselves a series of questions about each species. Does it live in papyrus marsh or open ponds? If in the marsh does it perch on vegetation or does it remain in the water? If it climbs on the papyrus stems, how high above the surface of the

water does it sit? One foot? Two feet? Six feet?

METHODICAL RECORDS

To answer questions of this sort it is necessary to collect specimens, number them, and record the numbers opposite notes on the exact situations in which they are found. Back in the Museum laboratory, the notes on several thousand frogs can be analyzed and perhaps answers to the questions will emerge. This process of analysis is not easily done in the field because many species cannot be named with certainty away from a laboratory and a library. And it is no good having a collection of notes attached to species called who's-it or what's-it. We must have the notes associated with, say, *Rana grandisonae* so that information collected in the Parc National de la Garamba can be compared with similar information gathered in other parts of Africa. Science is not a mere collection of facts; it is a series of relationships based on facts. And in our branch of natural science, as well as in all others, these relationships cannot be derived without proper identification of the animals (or plants or molecules) involved.

At this stage of the game, when the study of our specimens and notes has just begun, it is impossible to say how many questions we succeeded in answering. But this much is certain: if our field work was successful, we have probably raised more questions than we have answered. For it is in the nature of science that solutions to one set of problems reveal other problems that we could not even conceive before.

MINERALOGY IN VERSE AT DARWIN HOME

The unusual poem, reprinted here with a paraphrase of its original introductory material and footnotes, was published in *The American Journal of Science, and Arts*, Volume 5, in 1822, as part of a series occupying ten pages, put forth with a sufficient supply of footnotes, abstracts, subtitles, and morals to equip a definitive edition of *Paradise Lost*. The name of the author does not appear. The material was uncovered for reprinting in the BULLETIN by Eugene S. Richardson, Jr., Curator of Fossil Invertebrates. The 1822 spellings are retained.

The *Granitogony*, a bit of 19th century natural history in metrical form, was written in 1811, when the author was on a visit at Derby, the former residence of Dr. Erasmus Darwin, grandfather of Charles Darwin. In the company of a few scientific friends it was suggested, that, if Erasmus Darwin, who wrote an outline of evolution in verse, had lived to see the progress of geology, he would have favored the world with another poem, *The Loves of the Mountains*. Impressed with this idea, the author, on the following day, to amuse himself on a long and solitary walk in December, composed the following verses. They were written and shown on his return, and the Moral quatrain was afterwards added.

At the period when this poem was composed, the author was more disposed to adopt the theory of those philosophers who assert that the world has been baked, than that of the German Geognosists, who assert that it has only been boiled. He later inclined to a midway faith, and was disposed to believe that the crust of our planet has been stewed, fire and water being equally operative in its formation.

GRANITOGONY

OR

THE BIRTH OF GRANITE

In ancient time, ere Granite[1] first had birth,
And formed the solid pavement of the earth,
Stern Silex[2] reign'd, and felt the strong desire
To have a son, the semblance of the sire.
To soft Alumina[3] his court he paid,
But tried in vain to win the gentle maid;
Till to caloric and the spirits of flame
He sued for aid—nor sued for aid in vain:
They warm'd her heart, the bridal couch they spread,
And Felspar[4] was the offspring of their bed:
He on his sparkling front and polished face
Mix'd with his father's strength his mother's grace.
Young Felspar flourish'd, and in early life
With pale Magnesia lived like man and wife.
From this soft union sprang a sprightly dame,
Sparkling with life—and Mica[5] was her name.
Then Silex, Felspar, Mica, dwelt alone,
The triple deities on Terra's throne.
For he, stern Silex, all access denied
To other gods, or other powers beside.[6]
Oft when gay Flora and Pomona strove
To land their stores, their bark he rudely drove
Far from his coast; and in his wrath he swore
They ne'er should land them on his flinty shore.
Fired at this harsh refusal, angry Jove,
In terrors clad, descended from above;
His glory and his vengeance he enshrouds,
Involved in tempests and a night of clouds:
O'er Mica's head the livid lightning play'd,
And peals of thunder scared the astonished maid.
To seek her much-loved parents quick she flew;
Her arms elastic round their necks she threw,
"Thus may I perish, never more to part,
Press'd to my much lov'd sire's and grandsire's heart!"
So spoke the maid. The thunder-bolt had fled,
And all were numbered with the silent dead.
But, interfused and changed to stone, they rise
A mass of Granite[7] towering to the skies.
O'er the whole globe this ponderous mass extends,
Round either pole its mighty arms it bends;
And thus was doom'd to bear in after time
All other rocks of every class and clime.
So sings the bard that Granite first had birth,
And formed the solid pavement of the earth:
And minor bards may sing, whene'er they list,
Of Argillaceous or Micaceous Schist.

MORAL

(The friend to whom this poem was shown in 1811, suggested the propriety of annexing a Moral. In compliance with general custom, the author followed the advice. It would, however have been more consonant to his own modesty, to have left the moral application to the reader's sagacity than to have thus obtruded it on his notice.)

Learn hence, ye flinty hearted rocks,
Your burthens all to bear,
Lest Jove should fix you in the stocks,
Or toss you in the air.

THE AUTHOR'S COPIOUS FOOTNOTES

Appended to his poem, the author offered the following extensive explanations of various points:

[1] Granite.—This rock is essentially composed of three minerals, Quartz, Felspar, and Mica united, without any cement, or without interstices between them; frequently the three minerals appear to penetrate each other. Hence it has been supposed that these minerals were crystallized and united when the mass was in a state of fusion.

[2] Silex.—This earth is one of the principal constituent elements of the three minerals that form Granite. Quartz is nearly pure Silex; it is more imperishable than Felspar or Mica.

[3] Alumina.—This earth is soft and unctuous when moist. It is a constituent part of Felspar, in which it is combined with a large portion of Silex, and with other ingredients. As Silex and Alumina cannot be made to combine chemically by water, the Muse has properly sought aid from caloric to promote their union.

[4] Felspar, when crystalline, is distinguished by its laminar structure and smooth shining face.

[5] Mica.—The descent of Mica may be rather dubious: the quantity of Magnesia which enters into the composition of this mineral, as given in some analyses, is very small.

[6] Siliceous earth alone is extremely unfavorable to vegetation, and granitic rocks, in which this earth abounds, remain for ages denuded and barren.

[7] Granite forms the summits and peaks of

(*Continued on page 12, column 3*)

'Do-It-Yourself' Project . . .

A PERSONAL HERBARIUM FOR THE HOME

By C. EARL SMITH, Jr.
ASSOCIATE CURATOR, VASCULAR PLANTS

HAVE YOU EVER had the urge to press a flower? If so, then you have come a long way toward assembling your personal collection (or herbarium) of dried plant specimens. Almost everyone decides to make a record of plants which he knows or particularly likes. Many people make a collection photographically. It is equally easy to make a permanent record of the plants themselves, and it is far less expensive.

For hundreds of years, horticulturists and botanists have kept a record of the plants of interest to them. Pressed specimens 200 and 300 years old still preserve the form and

SPECIMEN COLLECTED BY LINNAEUS
Founder of modern system of nomenclature preserved this plant prior to 1800. It is still good.

characteristics of the species although they may lose their original fresh color. If one needs to soften a plant part to dissect it, the piece may be dropped into a small amount of water and boiled gently for a few minutes. It is then ready to be manipulated; it is as soft as it was when fresh.

The major supplies needed for plant pressing are not difficult to obtain. A stock of old newspapers to absorb moisture and hold the specimens is the first requirement. The second is a method of holding the plant flat while it is drying. Otherwise it will tend to curl badly as the different plant tissues contract unevenly. An old board and some bricks for weights will suffice. Once the specimen is dry, it may be kept in its fold of paper indefinitely.

Those of us who are involved in handling large numbers of plant specimens have several refinements in technique and equipment which make the drying process faster and easier. Between each fold with a specimen we insert a sandwich made of two sheets of blotting paper (called driers) the size of the half newspaper fold between which is a piece of corrugated cardboard (a ventilator) of the same size. Obviously, the driers absorb the moisture readily, and the corrugated cardboard facilitates its dispersal into the surrounding air. A stack of specimens between their sandwiches is ordinarily held tight between two lattice frames of wood by a pair of web straps or ropes. To supply the ultimate in speedy drying, the loaded plant press is placed over a heat source so that most plant specimens will dry within 36 hours. Of course fleshy plants like orchids will require a longer time to dry, and a few, such as the cactus plants which are particularly adapted for retaining their moisture, will take many days. I have even had cacti in the press for as long as two weeks and still they promptly sprouted again!

SHRUBS AND TREES

If you wish to make specimens of shrubs and trees, a branch tip with leaves and flowers or fruits cut to fit the size of the half news sheet is sufficient. Small soft plants are usually collected with their roots (many times you must be careful to collect the basal rosette of leaves which will remain firmly anchored to the ground when the flower spike is carelessly pulled). If you become sufficiently interested in this fascinating hobby, you may also wish to collect the non-flowering plants such as the mosses which form the bright green woodland carpets, and the lichens which vary in color from green to gray to white and are usually firmly attached to the tree trunk or rock on which they grow. When a lichen is too firmly anchored to remove, a piece of the substrate must be taken with it. Mosses and lichens may be put directly into small brown paper sacks (candy sacks in which you used to get your penny jaw-breakers). These are allowed to dry without pressing.

Aquatic plants are another group requiring special care for the submerged kinds. These include both a non-flowering group known as algae—the seaweeds of the ocean shore—and flowering plants like *Cabomba* which are frequently sold for aquariums. Because these plants are soft and depend upon the buoying effect of the water to hold them up, they can't be picked up and placed on the news sheet for pressing. To make nice looking specimens, float them in water in a shallow tray, slide a piece of stiff bond paper under them, and lift gently so that the water flows evenly off the sheet. For algae which are frequently gelatinous, a sheet of waxed paper must be placed over them to prevent them from sticking to the covering sheet of newspaper.

Dried plant specimens can be useful as well as being solely a record of a trip or an occasion. While the color will change in many plants when they are exposed to light, most plants are easily recolored with transparent photographers' tinting paints. Mounted in frames, they make attractive "flower prints"—frequently much more accurately detailed than those available at a print shop. Or try mounting them between two thin sheets of rice paper and making them into decorative lamp shades. They can even be placed between sheet plastic (the translucent kind makes a more effective background) and incorporated into a decorative screen or mounted in a French door in place of glass.

When you get started on your plant collection, the children will want to get into the act. For the youngsters, whose interest lags more quickly, specimens of common trees or flowers can be quickly sealed (with an iron) between two sheets of heavily waxed paper. A little experience will soon determine the correct heat and pressure. Here, the thinness of the specimen is important, as the waxed paper will tend to bulk irregularly around thick parts. My children like to take such specimens to school to demonstrate common plants when the teacher is teaching a general science section on plants. This works equally well for colorful autumn leaves, as plants encased in waxed paper retain their freshness for some time.

Once you have accumulated a few specimens, the problem of mounting them for use or display arises. Because you have been preparing your specimens to fit a half news sheet, they are now correctly proportioned to fit a standard sized sheet of herbarium mounting paper (11½ x 16½ inches). Any heavy white paper cut to this size will do, although a good quality paper is needed for permanence. Formerly, specimens were dropped into a thin sheet of glue on a glass plate, transferred to the paper, and then reinforced with gummed linen tape (Holland tape of the bookbinders). Most large herbaria now use a plastic adhesive. The specimen is laid on the paper and plastic strips are placed across to hold the plant in place. Where a plant tends to be unruly and stands up from the paper, a small weight will hold it down until the plastic hardens. The herbarium of the Museum just instituted this method of mounting in the spring. In the first month, mounting output rose 211 per cent as there is only one handling of the specimen; the label is glued into place with the same plastic. The adhesive is dispensed from ordinary plastic squeeze bottles (ours are bright red and labeled ketchup).

LABELING IS IMPORTANT

The label hasn't been mentioned before, but it is one of the most important parts of a scientific collection. The legend should include the place and date collected, any data which will not be apparent from the specimen—flower color, height of tree, etc.—and the collector's name. Be sure and leave

space for the name of the plant when you have made the identification. Many valuable supplementary data on the type of soil, the locations of the plant in relation to other plants and other facts are easily and permanently recorded on the label. If you plan to collect many specimens, a field notebook carrying notes behind consecutive numbers can easily be matched with numbers on the margin of the newspaper when you come to the labeling later on.

Identifying the collections is sometimes a problem. For a start, one of the books dealing with common wild flowers or trees of your region is recommended. Once the vagaries of botanists and their whims for placing plants in certain families regardless of flower color are conquered, you will find a pattern emerging which will enable you to recognize plant families as you gather the specimens. Now is the time to graduate to more technical books and articles dealing with the plants of specific areas or specific groups of plants. While the language of botany may seem hard, don't despair. You will soon be thankful for the more specific meaning of a botanical term when you realize how difficult it would be to describe the characters of a plant in common English words with their many connotations.

COLLECTING FUNGI

Fungi have purposely been ignored in the previous discussion. This great group of plants includes many parasitic diseases of other plants like the rusts and mildews. These are easy to collect (you just press the infected part of the host plant), but they are rather difficult to identify without a good microscope. The mushrooms of the woods and fields are more easily identified, but they are more difficult to collect readily. While

MODERN METHOD

Most present-day herbaria in the United States use a plastic cement to strap plant to a herbarium sheet.

they are fresh, either an accurately colored drawing (or photograph) must be made, or detailed color notes taken. Then spore prints are desirable to ascertain the color of the spores. These are made by breaking off the cap and leaving it bottom-side down on a piece of paper over night. The resulting spore pattern may be fixed in place by gently spraying with artists' fixative. Frequently, fleshy fungi must be plunged into boiling water or a preservative like formaldehyde to kill insects which continue to feed on them after you have gathered them. Only now are the specimens ready to be dried. Don't press them though—they squash into an unrecognizable mess. The results are usually quite shriveled except for the woody bracket fungi frequently seen growing on tree trunks.

You will find many pleasant returns from a plant collection. Whether it is to be used primarily for decorative effects, or as a means to a knowledge of the plants around you, you will find that you have acquired a new manual skill and a much greater awareness of the out-of-doors.

To help you start, here is some recommended reading for techniques in pressing and mounting:

Lawrence, G. H. M. *Taxonomy of Vascular Plants.* New York. 1951. (See Chapter II, Field and Herbarium Techniques).

How to find a name:

Bemson, Lyman. *Plant Classification.* Boston. 1957. (See Chapter I, Identification of Vascular Plants).

You'll want to look carefully through both of these. Once you have a few specimens, try identifying them here:

Mathews, F. S. *Field Book of American Wild Flowers.* New York. 1929.

Wherry, Edgar T. *Guide to Eastern Ferns.* Lancaster, Pa. 1937.

MacDougall, W. B. *Field Book of Illinois Wild Flowers.* Illinois Natural History Survey Manual I. 1936.

For a more technical treatment on the vascular plants of Illinois:

Jones, George Neville. *Flora of Illinois.* Amer. Midl. Natural. Mono. Ser., Notre Dame, Ind. ed. 2. 1950.

Now you're on your own. You'll find many books both general and specific, on the shelves of your local library. Others are listed in the first two books above. Happy plant hunting!

Botanist Completes Survey

Dr. John W. Thieret, Curator of Economic Botany, has returned to the Museum from a two-month field trip in the Great Slave Lake-upper Mackenzie River region, Northwest Territories, Canada. Much of his time was devoted to a survey of the flora and vegetation along the newly-opened Enterprise-Mackenzie River Highway, including the spur to Kakisa Lake. Four days were spent at Lake-on-the-Mountain atop the Horn Plateau, reached by airplane. Both the highway and the plateau are areas that previously had not been explored botanically. Dr. Thieret was assisted in the field by Robert Reich of Chicago, who recently was appointed Custodian of the Herbarium.

STRING QUARTET TO PLAY IN MUSEUM THEATRE

A series of five chamber music programs will be presented by the Festival String Quartet in the James Simpson Theatre of the Museum. The first will be given on the evening of Wednesday, December 9; the others will be given on the second Wednesday evening of each of the next four months. Admission to the concerts will be free, and all of them will begin at 8:15 P.M.

The Festival Quartet is composed of Sidney Harth, Chicago Symphony Orchestra concert-master, and his wife Teresa—violinists; Rolf Persinger, assistant first violist with the Chicago Symphony; and Harry Sturm, also with the Chicago Symphony, who shares the symphony orchestra's first cellist position. At the December 9 concert Leon Fleisher, pianist, will appear as guest artist with the quartet.

The programs are provided by the Free Concerts Foundation, Inc., and were made possible by Mrs. J. Dennis Freund, well-known civic leader and president of the foundation.

Tickets may be obtained by calling in person at the Museum, or by writing Free Concerts, Chicago Natural History Museum (Roosevelt Road and Lake Shore Drive, Chicago 5) and enclosing a stamped, self-addressed envelope.

SOUTHWEST EXPEDITION—

(*Continued from page 7*)

others; how they were frustrated by defeatism and inertia; how, in short, man unconsciously reached for civilization.

In a sense we are tying together the threads of past cultures and in so doing we are gaining an understanding of the human spirit. Such knowledge levels all barriers, whether linguistic, spatial, or temporal. Henry Brooks Adams said that a teacher affects eternity; he can never tell where his influence stops. And so it is with knowledge of a culture. We date it, but it is timeless and affects eternity.

The accomplishment of the physical aspects of our work is not easy or glamorous. Throughout the summer with its attendant heat, insects, dust, and sweat, we have been aided, amused, comforted and vastly benefited by the help of our colleagues: Miss Margaret Alder, Howard Anderson, Michael Fox, Martin Hoffman, Allen Liss, William Longacre, Mrs. Martha Perry, Mrs. Ruth Rinaldo, Roland Strassburger, and Mark Winter. A true flame of comradeship has been kindled between all of us as a result of a satisfactory but hard season's work. Such a summer welds us all close together. Thanks of a boundless nature must be extended to the owners of the ranches in the Vernon area who munificently co-operated with us: Robert B. Hooper of Springerville; Earl Thode of Vernon, and E. I. Whiting of St. Johns.

JOURNEYS FOR CHILDREN

November is the last month in which children can complete the Museum Journey on the subject of "Giant Plants." It may be taken by any boy or girl, any day, at any time within Museum visiting hours. At either entrance of the building, children will receive, on request, their "travel directions" which will guide them to various exhibits showing some of the world's largest kinds of plants. From these, the youngsters may obtain the information enabling them to fill in the answers to questionnaires which accompany the Journey directions.

Beginning December 1 a new Journey will be offered under the title "Animals of the Ice Age." This will continue as the subject through January and February.

With the completion of four Journeys on different subjects, children receive awards as Museum Travelers. Those who complete eight Journeys qualify as Museum Adventurers; twelve Journeys win them the title of Museum Explorers. Those who go on to the successful completion of 16 Journeys are eligible for a Special Journey which may admit them to the Museum Discoverers Club.

NEW MEMBERS

(September 16 to October 16)

Associate Members

Herbert R. Arnold, George Hugh Barnard, Jason Ernest Bellows, Aldis J. Browne, Jr., John C. Butler, Edgar J. Call, Anthony R. Chiara, Morton A. Davis, Vernon K. Evans, Mrs. Frank Fink, Mrs. J. Dennis Freund, Miss Lenore Helmich, Dr. G. Duncan Hinkson, Russell D. Hobbs, Glen W. Holderby, Paul F. Ilg, Walter L. Jacobs, Dr. George D. Kaiser, A. T. Kearney, J. L. Keeshin, Alfred S. Markus, Mrs. James W. Merricks, Mrs. Michael F. Mulcahy, Roy B. Munroe, Mrs. Paul Rowan, Dr. Edward C. Smith, Miss Kate Staley, E. Norman Staub, Mrs. Clement D. Stevens, Frederick W. Straus, Mrs. Isabel B. Wasson, William T. Young

Sustaining Members

Rex J. Bates, Dr. Harry K. Waddington

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STAFF NOTES

Bertram G. Woodland, Associate Curator of Petrology, recently was guest speaker for the Chicago Lapidary Club. His topic was "Discoveries Through Geology." . . . **Dr. Eugene S. Richardson, Jr.,** Curator of Fossil Invertebrates, recently lectured on "Fossils of Illinois" at Maine Township High School. . . . **William D. Turnbull,** Assistant Curator of Fossil Mammals, spoke before the Kennicott Club on "Geology and Fauna of the Washakie Basin." . . . **E. Leland Webber,** Executive Assistant, and **Miss Miriam Wood,** Chief, Raymond Foundation, represented the Museum at the annual meeting of the Midwest Museums Conference in Toledo, October 21–23. Miss Wood was chairman of the program committee, and moderator of the session on Education in Museums. Mr. Webber was a speaker in the session on Museum Sales Desks.

Recorded Bird Calls Banned

The use of recorded calls of ducks and geese by hunters has been prohibited by both the Canadian and United States Wildlife Services. This was done because the recorded calls, of geese especially, are too effective in luring the birds within shooting range, resulting in an excessive wildfowl kill.

(*Auk*, 1958, p. 87)

MINERALOGY IN VERSE

(*Continued from page 9*)

lofty mountains. It is also supposed by geologists to be the lowest rock with which we are acquainted, forming a foundation for other rocks in every part of the globe.

At the time when this poem was written, "philosophers" were still discussing the two points of view of the origin of igneous rocks. One group, the Neptunists, were convinced that granite and its allies were deposited, like sandstone or shale, from sea water; the other group, the Plutonists, held to a theory of igneous origin. Modern knowledge of physical chemistry has upheld the latter view. Silex is the archaic name for silica, the oxide of silicon. Felspar, of course, is now called feldspar. Caloric, a noun, was the current name for heat in chemical writing.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology

From: Mrs. Lyman J. Carlock, Oak Park, Ill.—Oriental ethnological materials; Louis H. Fuchs, Downers Grove, Ill. — Oriental ethnological objects; Dr. David C. Graham, Englewood, Colo.—porcelain jarlet, string of beads, China; Mrs. Walter S. Haldeman, Cape May, N.J.—Mandarin coat, China; Mrs. Harold E. Rucavado, Tucson, Ariz.—22 pottery and stone objects, Costa Rica

Department of Botany

From: H. R. Bennett, Chicago—736 phanerogams; Dr. Henry Field, Turkingham, Mass.—3 bracket fungi; Fisheries Research Board, London, Ont., Canada—15 phanerogams; J. Soukup, Lima, Peru—14 plants; Dr. L. H. Tiffany, Evanston, Ill.—10 phanerogams

Department of Geology

From: Earl Christensen, Hammond, Ind. —3.62-carat brilliant cut white beryl; W. P. Leutze, Richmond, Ind. — Silurian fishes; Dr. Rainer Zangerl, Hazelcrest, Ill.—copper casts of five specimens of *Glarichelys knorri* (turtle), Switzerland

Department of Zoology

From: Sophie Andris, Chicago—fox squirrel; Paul F. Basch, Ann Arbor, Mich.—nonmarine shells, Guatemala; Dr. S. Stillman Berry, Redlands, Calif.—snails and clams; Mrs. W. G. Bott, Arlington Heights, Ill.—sea shells; Dr. John C. Briggs, Vancouver, B. C., Canada—a fish specimen; Mrs. Harriet Burkhart, Union City, Pa. — shells, Jamaica; Emery P. Chace, San Diego, Calif. —land snails, Eastern Pacific; Steve Collings, Rockville, Ind.—several hundred millipedes; University of Colorado, Boulder—non-marine snails; Walter J. Eyerdam, Seattle—pearly freshwater mussels; Florida State Board of Conservation Marine Laboratory, St. Petersburg, Fla.—3 fishes; L. H. Fuchs, Downers Grove, Ill.—2 pair of deer antlers, Philippines; Harry Hoogstraal, Cairo, Egypt —54 mammals, 99 bird skins, 100 insects and allies, 25 lizards, 33 snakes, 46 ticks, bird lice

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Members are requested to inform the Museum promptly of changes of address.

WILDLIFE OF AMERICA IN AUDUBON FILM

An exciting journey, in color motion pictures, from the marshes of the Dakotas to the Rocky Mountains of Canada will be presented in the Illinois Audubon Society's Sunday screen-tour on the afternoon of December 13 in the James Simpson Theatre.

Cleveland P. Grant, well-known naturalist formerly of the Museum staff, and a long-time favorite of Chicago audiences, will be the lecturer. He will show his recently completed film, "Adventures in Color With American Birds and Big Game," preparation of which required four years of intensive effort under difficult conditions in remote lairs of four-footed and winged creatures.

The lecture begins at 2:30 P.M. Admission is free. Members of the Museum are cordially invited to attend, and to bring guests.

New York Museum Honors McBain

The trustees of the American Museum of Natural History in New York honored Hughston M. McBain last month by electing him as a member of their board. Mr. McBain, First Vice-President of Chicago Natural History Museum, has been a Trustee of this Museum since 1946.

STAFF NOTES

George I. Quimby, Curator of North American Archaeology and Ethnology, recently made a field trip to Whitehall, Michigan, where as part of his Upper Great Lakes Paleo-Indian studies he examined sediments dredged from a bay in White Lake. At the Museum of Anthropology in Ann Arbor he studied archaeological collections, and in Grand Rapids he conducted a Paleo-Indian seminar for the Michigan Archaeological Society. . . . **Dr. Roland W. Force,** Curator of Oceanic Archaeology and Ethnology, lectured on "Cultural Changes in the Palaus" at the Borg-Warner Research Center of the Scientific Research Society of America. . . . **Dr. Kenneth Starr,** Curator of Asiatic Archaeology and Ethnology, prepared text and a pictorial feature on Chinese rubbings for the December *Fine Arts Guide* published by FM Radio Station WFMT. Earlier issues have featured Museum material on the South Pacific, primitive art, and American Indian art, through the cooperation of Curator Force, **Phillip H. Lewis,** Assistant Curator of Primitive Art, and **Dr. Donald Collier,** Curator of South American Archaeology and Ethnology. . . . **Dr. John B. Rinaldo,** Assistant Curator of Archaeology, has been appointed to the panel of editors of *Archives of Archaeology* of the Society of Archaeology Publications. . . . **Dr. Theodor Just,** Chief Curator of Botany, recently spoke on "Biogeography and Continental Drift" before the Conference of Midwest College Biology Teachers at Notre Dame University. . . . **Dr. John W. Thieret,** Curator of Economic Botany, attended the Symposium on Systematics at Missouri Botanical Garden, St. Louis. He also was guest speaker before the Kiwanis Club of Lake Forest, Illinois. . . . **Dr. Rainer Zangerl,** Curator of Fossil Reptiles, and **Dr. Robert H. Denison,** Curator of Fossil Fishes, attended the meetings of the Society of Vertebrate Paleontology in Pittsburgh. Dr. Denison was elected secretary-treasurer. Dr. Zangerl and **Albert W. Forslev,** Associate Curator of Mineralogy, attended meetings of the American Geological Institute. . . . **Dr. Karl Koopman,** Assistant Curator of Mammals, spoke on "West Indian Zoogeography" before the Zoology Club of the University of Chicago. . . . **Rupert L. Wenzel,** Curator of Insects, lectured on "The Field of Entomology" before the Biology Club at the Chicago Academy of Sciences. **D. Dwight Davis,** Curator of Anatomy, was guest speaker on "Mammalogy" at another meeting of the same organization.

The entire geological sequence of life, covering some billions of years, is indicated by exhibits in Frederick J. V. Skiff Hall (Hall 37) and Ernest R. Graham Hall (Hall 38).

THIS MONTH'S COVER

The design reproduced on the cover is an ink rubbing of the inscribed "head" of an ancient Chinese roof tile, the whole of which tile is illustrated on page 3. The felicitous inscription, most appropriate in the month of Christmas, reads "Chiang-le wei-yang" (長樂未央)—"lasting happiness, without end." There is some wistfulness in such a thought, for as the Chinese say, "The years do not wait for us," and yet few, indeed, are they who have even moments of deep happiness. Rubbings of such inscriptions long have been collected by Chinese scholars, whose interest, however, is not so much in the sentiment expressed, as in the archaic forms of the characters.

4-H BOYS AND GIRLS TO VISIT MUSEUM

The first day of December will be 4-H Day at the Museum. Junior farmers and cattle breeders from most of the rural areas of the United States, and several foreign countries as well, will continue a tradition of many years by visiting the Museum in large groups. Approximately 1,300, both boys and girls, selected in their local areas in recognition of their achievements, and dispatched as delegates to the 38th National 4-H Club Congress, held in Chicago in conjunction with the annual International Livestock Exposition, will compose the groups brought to the Museum.

The lecturers of the Raymond Foundation, and other members of the Museum staff, will conduct tours of exhibits for some of the young visitors, and will arrange assistance in other forms for those who seek out for themselves the material in the Museum especially coinciding with their personal interests. The 4-H groups represent some of the finest elements among America's youthful citizens, and the Museum staff is always especially happy to welcome these visitors.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons by advance request.

'RUBBING' AGAINST HISTORY AND CULTURE OF CHINA

By MARILYN JINDRICH
ASSOCIATE EDITOR

A CHILD is seated in the middle of the floor. Around him are strewn nickels, dimes, pennies, quarters. With the coins the youngster is industriously engaged in an absorbing task of coin reproduction, putting out copies with almost production-line skill.

No, this is no precocious "child counterfeiter" laying the groundwork for a future career. His reproductions are not the lead-slug variety, or something of that sort. His are crayon reproductions on paper . . . rows and rows of currency patterns made by placing paper over the coins and applying a crayon to the paper surface. Doubtless, everyone at one time or other during his childhood has found enjoyment in some similar activity, whether the object copied be coins, tiles on the bathroom floor, or text book covers doodled over during a particularly deadly portion of a lagging lesson. What junior doesn't know is that his entertaining pastime had its beginning 1,400 years ago in China. His efforts are actually a variation of the ancient Chinese art of "rubbing," an example of which appears on this BULLETIN issue's cover.

SOURCE OF OUR COVER DESIGN

The inscription on the head of this ancient roof tile in the Museum's Chinese collections was used in making the rubbing for this Bulletin. Specimen dates from Han period (207 B.C.-A.D. 220).

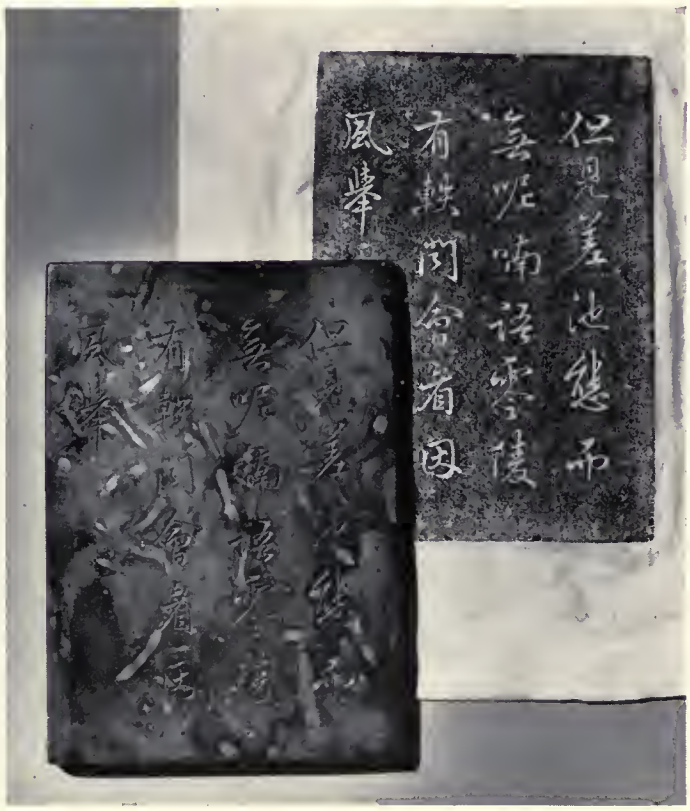
What exactly are "rubbings?" How does one make an actual rubbing, as it is done in China? What is the value of rubbings?

LARGE COLLECTION HERE

These are questions that Dr. Kenneth Starr, Curator of Asiatic Archaeology and Ethnology, has been answering since his arrival at Chicago Natural History Museum in 1953. This situation has arisen because, with the Museum's collection of rubbings at his disposal—it is one of the largest and most representative in the world—Dr. Starr has had opportunity actively to pursue study of the ancient art, and to delve deeply into the history and technique of Chinese "rubbings." As a result the curious often seek him out for a rundown on the subject.

That these explanatory excursions into the art and history of "rubbings" sometimes make unusual demands of Dr. Starr's knowledge is demonstrated by a recent television appearance he made at Ann Arbor, Michigan, for the University of Michigan. "The Gentle Art of Rubbing" was the theme of the television show, and in connection with it Dr. Starr was asked to make a rubbing of an inscription on a tombstone from China. The stone was a tribute to a deceased University of Michigan professor who had spent a number of years in that country in service to the Chinese government. The tombstone had been sent to his family. Dr. Starr made a rubbing of the inscriptions on the stone, with the step-by-step process recorded on film. Later the film was shown as part of the TV program.

This again leads us to the earlier questions of what are rubbings and how are they made? Specifically, "rubbings are ink-on-paper copies of low-relief or intaglio (incised) inscriptions and designs on stone, metal, fired clay, and other hard materials."



INCISED STONE SLAB, AND RUBBING

The traditional love of antiquity manifested by the Chinese, and their penchant for memorializing poetic or philosophic passages, are exemplified in the inscription on the small polished piece of calcareous limestone above at left. It is a poem, which is copied in the ink rubbing at the right. The back of the stone is an irregular layer composed of a tangled mass of fossil trilobites from the Paleozoic Era, hundreds of millions of years ago, and its age probably attracted a scholar's reverence.

According to Dr. Starr, their origin dates back to the 5th or early 6th century in China when the technique was used to copy stone-cut classical texts. The texts, by reason of their content and history, often were revered by the people as great guideposts in the "journey through life." As a result, the people would travel long distances to copy particular texts. For many years the copying was done by hand—a lengthy and tedious job. The necessity for streamlining the arduous copying process was eventually recognized by some enterprising individuals who hit upon the idea of direct transferral of the texts from the stones themselves. And so . . . "rubbings" were born.

But now let's turn to the actual mechanics of making a "wet rubbing," as distinguished from a "dry rubbing" mentioned earlier, made with a crayon or pencil. First of all, the ingredients used in the process are paper, sizing liquid, brushes and pads, and an inking wad. Just as the quality of the materials that go into the construction of a building often determine its durability and beauty, so, too, certain refinements in the type and quality of the materials used in making "rubbings" greatly influence the end product.

Depending on the purposes for which the "rubbings" were made, extraordinarily unique variations in the materials and technique of "rubbing" were developed by the Chinese. Unfortunately, many of the refinements in materials and methods employed in the making of ancient rubbings fell into disuse and in the progress of time have gravitated to the category of "lost arts." Dr. Starr, after several years of painstaking translation of old Chinese writings, has unearthed a number of the unusual methods that were used.

In brief, the technique used in making a "rubbing" involves a multi-stepped process. It can be explained as starting first with the actual cleaning of the object to be copied, after which step comes the application of the paper. The paper, that already has been sized with a special sizing liquid, is laid on the object and tamped to bring it into inti-

(Continued on page 8, column 1)

'HE INFLUENCED THE COURSE OF DARWIN'S LIFE'

By THEODOR JUST
CHIEF CURATOR OF BOTANY

THROUGHOUT his life, Charles Darwin regarded Alexander von Humboldt as "the greatest scientific traveller who ever lived." It was Humboldt's "Personal Narrative of Travels to the Equinoctial Regions of America During the Years 1799–1804" that affected the whole subsequent course of Darwin's life.

Today it is well known that Humboldt's

ALEXANDER von HUMBOLDT, 1769–1859
From an old engraving

travels in tropical America were possible only after securing permission from the king of Spain to explore the Spanish possessions which, like those of Portugal and Holland, had so far been closed to travelers. The observations and collections made on this expedition gave Humboldt the data to establish plant geography on a scientific basis.

In addition to the botanical and zoological collections, Humboldt acquired the first geological specimens and numerous data of a geodetic character, as well as information on the various Indian tribes, their languages, artistic accomplishments, and mode of life. On June 9, 1802, he climbed Chimborazo near Quito, Ecuador, to a height of 19,286 feet (actual height 20,577 feet) and thus accomplished what no one before had dared. This climb has been compared with the conquest of Mount Everest in recent years. Humboldt and his companion, Aimé Bonpland, after traveling and collecting in Venezuela, Cuba, Peru, and Ecuador, continued their work in Mexico. Before returning to Europe, Humboldt spent eight weeks in the United States, three of which he spent with Jefferson at Monticello discussing, among other things, a Panama canal project. Humboldt also visited Peale's Philadelphia Museum, then the largest of its kind in the New World, and the "American Linnaeus," Henry Muhlenberg, in Lancaster, Pennsylvania. Upon returning to Europe in August of 1804 he was welcomed as the second Columbus.

FINANCED OWN TRAVELS

The entire trip was financed by Humboldt himself, using for this purpose 33,500 thalers, or one-third of his inheritance. The botanical collections amounted to 6,200 species, over half of which were new, and are mostly deposited in the Muséum National d'Histoire Naturelle in Paris. Fortunately, Chicago Natural History Museum now has many photographs of these type specimens and small portions taken from the original sheets (see illustration).

The study of the collections made in the Americas required 20 years, involving Humboldt, Bonpland, at first Willdenow of Berlin, and later, K. S. Kunth. Many novelties described by them bear the unmistakable combination of their initials, H.B.K. The

Specimen collected by Humboldt and now exhibited in Paris Museum.

results were published in a famous set of 30 volumes accompanied by more than 1,200 plates by Turpin. Humboldt again financed this enterprise and thus reached the end of his resources. He then returned home to Berlin and was appointed to the King's Council. In this position, he was sent on many important diplomatic missions, but was never obliged to stop his scientific investigations and writing.

In fact, by 1829 he decided to make an extensive trip to Central Asia and the Caspian Sea. Accompanied by a geologist, C. G. Ehrenberg, and a mineralogist, G. Rose, they brought back valuable collections and data. While in Russia, Humboldt predicted on geological grounds that diamonds would be found in the Ural Mountains. This prediction was quickly substantiated by a prominent landowner.

The later part of his life was devoted to his effort to present nature as a whole in his classic work *Cosmos*. In this respect he attempted what Aristotle and Albert the Great had tried before. In doing so, Humboldt proved to be a polyhistor, a man of universal knowledge.

Apart from his extensive collections of plants, it is interesting to note that he started his botanical studies by writing about low plants found underground near the School of Mining at Freiberg, where he studied geology. After that he applied the available knowledge of chemistry to agriculture and the physiology of plants. In South America he gathered all he could about cinchona and rubber plants. He also proposed the first system of growth forms of plants based on their appearance rather than the structure of the flower, as used by Linnaeus for classification. Then followed his famous books on the foundations of plant geography.

Humboldt's last biographer, Prof. Helmut de Terra of Yale University, has attempted to appraise in general terms Humboldt's contributions to the following sciences and humanities: anthropology, astronomy, botany, geography, geology, geophysics, meteorology, oceanography, physiology, and zoology. He also has given us a list of towns, counties, mountains, currents, and other geographic sites that bear Humboldt's name. In short, Humboldt was famous while he lived and, personally or by correspondence, in contact with the intellectual and political leaders of his time, ranging from Goethe and Schiller to Simón Bolívar and Thomas Jefferson. He held honorary membership in ten learned societies in the United States, the oldest in the American Philosophical Society of Philadelphia dating from 1804. Like Charles Darwin, he is being honored this year by various scientific societies and institutions.

Museums Professional Group Elects Miriam Wood

At its recent annual meeting, held in Toledo, Ohio, the Midwest Museums Conference accorded a signal honor to Miss Miriam Wood, Chief of this Museum's Raymond Foundation staff, by electing her as president for the ensuing year. The choice of Miss Wood for this post stems from her active participation and constructive work in the Conference over a period of several years. She has attained a high standing among colleagues in educational activities of museums for school children also because of the notably effective developments in this field made under her direction of the Raymond Foundation.

'BIRDS OF THE WORLD' NEARING COMPLETION

By EMMET R. BLAKE
CURATOR OF BIRDS

THE MUSEUM'S Synoptic Series of Birds of the World (Boardman Conover Hall —Hall 21) is nearing completion with the recent installation of a new exhibit showing representative birds of 20 additional families. As with previous sections of this series, the birds of each family or closely related group of families are mounted in lifelike attitudes on raised panels, the better to enable one to recognize the distinctive characters of each. The 43 species shown in the new exhibit were selected to illustrate the range of variation to be found in each of 20 bird families having a combined total of more than 700 species.

The four orders, or major taxonomic groups encompassed by the new exhibit, include birds of striking diversity. Some, as the hummingbirds, are notably small and others conspicuously large. Trogons, kingfishers, motmots and bee-eaters have brilliant plumage that is in strong contrast with the drab appearance of swifts, nightjars and various others that appear nearby. Oilbirds, potoos, nightjars and other nocturnal birds vie for attention with those of more "normal" daytime habits. Some of the birds shown are solitary in habits while others prefer to live in flocks. And geographically, virtually all parts of the world except the polar regions are represented by some of the bird families brought together in this exhibit.

To the ornithologist all birds are of some, if not equal interest. When sufficiently well known, even birds of undistinguished appearance often are found to have characteristics that excite the imagination. Consider the coly or "mousebird" of Africa, a rather small, crested bird with a long tail and dun-colored plumage. Although "just another bird" to the uninformed, colies are amazingly acrobatic and often hang head downward; indeed, some authorities state that they even sleep in this position.

Or consider the hornbills of Africa, tropical Asia and certain Pacific islands. The 45 species include some of the most grotesque of birds, but the family is perhaps best known by reason of its peculiar nesting habits. In some species the female enters the hollow-tree nest before the eggs are laid and plasters herself in with mud brought by the male. There she remains until the young are fledged, the duty of feeding the family being assumed by the male.

Nightjars and their relatives occupy a separate panel and at a glance are seen to share certain physical attributes. Most noteworthy are the soft dull plumage, weak feet, decidedly long wings, large eyes, expansive gapes and (usually) very weak bills. All are essentially nocturnal in habits, and most of them prey on insects skillfully captured in flight. Several of these birds have remarkable abilities only recently suspected and verified. For example, the poor-will, a western relative of the night hawk, is now known to be capable of true hibernation, and in this it may be unique among birds. Oilbirds, strange nocturnal denizens of northern South America, nest on ledges in deep caves from which they emerge at night to feed on the fruits of palms. Only in recent years has it been known that these birds avoid obstacles in the darkness, as do bats, by emitting sounds that rebound from hard surfaces.

The marvels of bird flight are perhaps best exemplified by swifts and hummingbirds, both represented in the new exhibit by several species. Swifts are aerialists of the highest order and appear to spend most of the daylight hours feeding on the wing. Reported flight speeds approaching 300 miles per hour undoubtedly are erroneous, but certain tropical swifts are considered the speediest of all birds and have been clocked at better than 100 miles an hour. Hummingbirds are slow by comparison, yet they too have astonishing aerial abilities, including that of reverse flight. Most remarkable, however, is the rapidity of a hummingbird's wingbeats, which may exceed 60 per second and can be seen only as a blur. Obviously, with birds as with people, greater familiarity often reveals unsuspected abilities that merit admiration.

The new exhibit was designed by the Division of Birds, and prepared by Staff Taxidermist Carl W. Cotton and Assistant Taxidermist Peter Anderson; art work is by E. John Pfiffner, Staff Artist.

SECTION OF NEW BIRD EXHIBIT

The Kingfishers. They vary greatly in size and color, but all have conspicuous anatomical similarities. Belying the family name, many species live in dry regions and prey on insects instead of fish. Counter-clockwise from upper left, the birds above are representatives of the: White-breasted, Common, Least Green, Kookaburra and Ringed species.

FREE CONCERTS BEGIN ON DECEMBER 9

For the first time since 1930, James Simpson Theatre will resound with the strains of chamber music at the opening performance of the Festival String Quartet on Wednesday, December 9, with noted pianist Leon Fleisher featured as guest artist for the evening.

The musical program will consist of Beethoven's "String Quartet Opus 59, No. 2," "Piano Quartet in E Flat Major," by Mozart, and Dvorak's "Piano Quintet." The string quartet is composed of members of the Chicago Symphony orchestra, including Sidney Harth, concertmaster.

The first chamber music concerts ever presented in the Museum were launched in 1926 under the sponsorship of Mrs. Elizabeth Sprague Coolidge. The concerts were free and were received with such enthusiasm that they were continued in the years 1927, 1928, and 1930 with the Chicago Chamber Music Society joining Mrs. Coolidge in sponsoring the concert series. All the series featured the music of the Gordon String Quartet.

This year's free chamber music concerts are provided by the Free Concerts Foundation, Inc., and were made possible by Mrs. J. Dennis Freund, president of the foundation. Following the December 9 performance, concerts will be given on January 12, February 10, March 9, and April 13, 1960. The performances begin at 8:15 P.M., and those attending may enter the Museum through the north, south, or west doors.

Tickets may be obtained by calling in person at the Museum or writing Free Concerts Foundation, Chicago Natural History Museum (Roosevelt Road and Lake Shore Drive, Chicago 5) and enclosing a stamped, self-addressed envelope. Guest artists for the January 12 concert are Phyllis Curtin, soprano, and Ray Stille, oboist, both well-known to Chicago music lovers.

Museum Not Open to Visitors Christmas or New Year's

In accordance with its custom, the Museum will be closed on Christmas and New Year's day, to permit all of its employees to enjoy the holidays with their families. These are the only days in the entire year on which the Museum is not open to the public.

THE CHRISTMAS ISLANDS DEFY YULE TRADITION

WITH THE SEASON fast approaching when countless columns in countless publications will be devoted to stories of the Nativity, Santa Claus, red-nosed reindeers, and Christmas customs and traditions, it seems only fitting that among all the reams of Christmas copy at least a few paragraphs should be devoted to the island that is the namesake of that popular holiday—namely, "Christmas Island."

First of all, it is necessary that one rather confusing fact be cleared up right from the start. And that is, there is not "a Christmas Island"—there are two such islands. What's more, neither is located near the North Pole, as popular Christmas lore would favor placing them. On the contrary, one Christmas Island is located in the Pacific ocean south-southeast of Hawaii in a chain of islands called the Line Islands, and the other is found in the Indian Ocean just southwest of Java. (We'll call them "Pacific Christmas" and "Indian Christmas" to simplify identification.)

Now, when the word "Christmas" is mentioned, automatically a number of popular symbols flash to mind—churches, Santa Claus, Christmas trees, carols, shopping, etc. An appropriate thought, considering the islands' name, is how well do the Christmas islands live up to the concepts associated with their name?

NO SNOW, NO HOLLY . . .

Going down the list, the first to be crossed off is snow. The tropical locations of the islands take care of that score. "Indian Christmas" is completely covered by luxurious tropical vegetation, while on the other hand, "Pacific Christmas" is a low semi-barren, uninhabitable island famous for its beautiful colors—but without much in the way of fauna, and without soil that will grow fruits and vegetables usually found in the tropics.

Naturally, it follows that under such climatic conditions, Christmas trees as we know them are also definitely out. And those proverbial halls would have to go undecorated if they depended on the Christmas islands for their supply of holly and mistletoe.

Reindeer? There are none on the Christmas islands, of course. As a matter of fact, there are no animals whatever of comparable stature or size. "Pacific Christmas" is inhabited mostly by birds (and lots of them), turtles, land crabs, rats, and recently cats. The animal life on "Indian Christmas" is similar, mostly birds, rats, bats, and certain kinds of insects.

WHENCE THE NAME?

At this time a perfectly reasonable and legitimate question to ask is, "How ever did the islands become labeled with such a misnomer?" A little history supplies the answer.

Let's go back to the year 1777. It is winter, and at a place called Valley Forge an army of American revolutionaries led by General George Washington is courageously holding its own against the elements in one of the fiercest winters the men had ever experienced—a winter later to be recorded in all U. S. history books. At the same time that struggle was going on at Valley Forge, on the other side of the earth another battle was being waged by a crew of able seamen led by a distinguished English navigator and explorer, Captain James Cook. But theirs was a struggle with the sea. Captain Cook was navigating the Pacific Ocean on a voyage that was destined also to get into history books.

On December 24, 1777, Captain Cook sighted land, a small island atoll in mid-Pacific. His ship was running low on food, so Captain Cook sent a party ashore to forage for additions to the ship's supplies. When the group returned the only thing they brought with them was a number of large turtles and the disheartening news that there was very little else besides turtles and birds to be found—and no fresh water. That evening when Captain Cook went to his journal he suddenly realized it was Christmas Eve. And that is how Christmas Island in the Pacific got its name.

As for "Indian Christmas," we have to go back a little bit further in history for its christening. The year was 1643. A homeward bound merchant ship of the East India Company, commanded by Captain Williams Mynors, was passing through the Indian Ocean when it unexpectedly came upon an atoll not shown on its charts. The day was December 25, Christmas Day. And so, another island was named. It was not always called Christmas Island, however, for a number of years after Captain Mynors landed on the atoll, some other voyagers landed there and gave it the name "Moni." On a few maps that name still appears, but Christmas Island is presently its official name.

BOTH ARE ATOLLS

It is a rather curious fact that the two islands, owned by the British, were discovered on the same day of the year, and consequently both named "Christmas Island," for the pattern of the subsequent development of the two is strikingly similar. As already mentioned, both are atolls ("Pacific Christmas" with 222 square miles is the largest atoll in the world), and although one is covered with luxurious tropical vegetation and the other is barren in comparison, they have in common the fact that they lack any appreciable surface water. This factor discouraged human habitation on either for a number of years.

The first considerable settlement on the islands occurred around the end of the 19th century, prompted by the hope of economic exploitation. Both the atolls appeared to be rich in phosphates, "Indian Christmas" having a number of large limestone outcrops, and "Pacific Christmas" having deposits of guano. (These deposits consist of the accumulated excrement of birds, usually sea fowl, and occur in rainless areas along the ocean. Guano has commercial use as fertilizer.)

The first few attempts at profitable exploitation of the atolls were rather unsuccessful, and as a result the islands changed hands a number of times. In 1940, however, "Indian Christmas" exported 238,006 tons of phosphates under the management of the Christmas Island Phosphate Company. Production stopped for a period during World War II when the island was occupied by the Japanese. The productivity of "Pacific Christmas" has been less notable. Although it was leased in 1913 to the Central Pacific Coconut Plantations, Ltd., by the British government for a period of 87 years for the production of coconuts, oil, pearl shell, and guano, since 1930 it has been used mainly as a British air stopover.

These are the stories of the Christmas islands, rather insignificant in their impact on history and the world's economy, and equally insignificant in their effect on the Christmas season . . . sure is a shame they don't have any reindeer . . . or snow . . . or . . . Santa Claus!

MARILYN JINDRICH

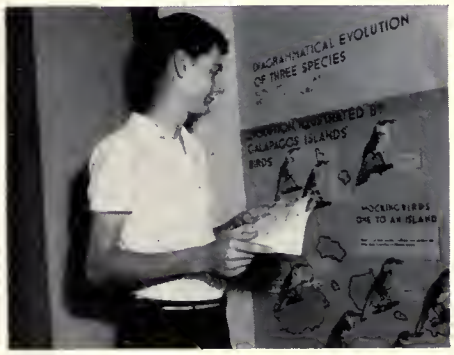
EXHIBIT OF DARWINIANA IN SECOND MONTH

The special exhibit, "Darwin's Origin of Species," opened last month to mark the centennial of the publication of the great naturalist's theories, will remain on view in Stanley Field Hall through December 31. There are six panels, each dealing with a phase of the Darwin story. Included are holograph letters written by Darwin, specimens he collected on the historic voyage of the *Beagle*, and a copy of the rare first edition of *Origin of Species*. In the photograph above. part of the exhibit is viewed by two high school girls—Karen Selchow, of Woodstock, Illinois. and Kathy Nelson of Chicago.

FOUR 'JOURNEYERS' NAMED FIRST 'DISCOVERERS'

A most unusual graduating class received diplomas November 21 on the stage of James Simpson Theatre. In the class were only four students, ages 11 to 15 years, and the "degrees" they received were not based on academic courses completed but on the successful accomplishment of 17 Museum "Journeys."

The graduates are participants in a special educational research program for children



started by the Museum's Raymond Foundation in March, 1955, and they are the first to complete 17 Journeys. (Nearly 5,000 Journey sheets have been turned in since 1955). The Journeys direct children to Museum exhibits that deal with various prescribed topics. "Passports," travel charts, and questionnaires for the Journeys are issued to interested children at the Museum entrances.

The 17th Journey, which qualified the four for graduation and membership in the Museum's newly formed "Discoverers' Club," is entitled "Voyage of the Beagle." It leads "journeyers" into fields in which Charles Darwin pioneered in his voyage on the ship of that name in 1831–36—a voyage on which he formulated most of his ideas concerning evolution. The journey is particularly timely in this centennial year of the "Origin of Species," commemorated in the Museum with a special pictorial Darwin exhibit which will be on display in Stanley Field Hall until December 31.

The four graduates now being admitted to the Museum's "Discoverers' Club" are: Boyce Brunson, 11, and his sister Carol, 12, of Chicago; Konrad Banasak, 15, of Whiting, Indiana; and Janet Mangold, 11, of Livonia, Michigan.

At the "commencement" program, awards were given to 43 other children in various

FOUR 'YOUNG DARWINS'—the first youngsters to complete a full course of Museum Journeys and win membership in the Discoverers' Club—are shown in the three pictures on this page. They are: Konrad Banasak, 15, Whiting, Indiana; Janet Mangold, 11, Livonia, Michigan; and Carol Brunson, 12, with her brother Boyce, 11, of Chicago.

stages of study at the Museum by Deputy Director John R. Millar: 20 received "Museum Traveler" recognition for completing four Journeys; nine were named "Adventurers" for eight Journeys; five were cited as new "Explorers" for 12 Journeys; and nine who completed 16 Journeys were admitted to the next group to do "The Voyage of the Beagle."

New Journey Topic

"Animals of the Ice Age" is scheduled as the new Journey for December, January, and February. It is based on the unusual animals that lived in the Chicago Region from 10,000 to one million years ago, such as the prehistoric elephants (mastodons and mammoths) and the giant beavers that reached lengths of nearly five feet. The Museum's skeleton of a giant beaver is one of very few known complete specimens. The Journey may be taken at any time during regular visiting hours.

NATURE PHOTO CONTEST JUDGES SELECTED

Five judges, including two members of the scientific staff of the Museum, have been selected to rule on the acceptance of photographs for exhibition, and the award of medals and ribbons in the 15th Chicago International Exhibition of Nature Photography.

The deadline for entries in this contest, sponsored jointly by the Chicago Nature Camera Club and the Museum, is January 18. The exhibition of successful entries will be held in Stanley Field Hall of the Museum from February 6 to 26.

Those named to the panel of judges are: Mrs. George W. Blaha, APSA, photographer and naturalist; Arthur Hunter, teacher and naturalist; Ray Sauers, photographer; and the two Museum staff members, Dr. Alan Solem, Curator of Lower Invertebrates, and Dr. John W. Thieret, Curator of Economic Botany.

In addition to the exhibit of prints, there will be two screenings of color slides on Sunday afternoons, February 7 and 14, at 2:30 P.M. in the James Simpson Theatre of the Museum.

For years this contest and exhibition have been the world's largest in the field of nature subjects, as well as one of the largest photography contests of any kind. In each of the two divisions of the contest (prints and color slides) there are three subject classifications: (1) Animal Life; (2) Plant Life; and (3) General, which comprises scenic views, clouds, geological formations, and other inanimate natural phenomena. Contestants may submit up to four entries in each division. The Museum will furnish entry forms and other information upon request. Entries should be mailed directly to the Museum.

In addition to medals and ribbons awarded by the Nature Camera Club in each classification of the two divisions, special medals for slides best illustrating color harmony in nature will be awarded by the Nature Division of the Photographic Society of America.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology

From: Walter Bujak, Cleveland—Ozalid copy of rubbing of Maya stone disc

Department of Botany

From: H. R. Bennett, Chicago — 1,007 phanerogams, Wisconsin, Indiana, Illinois; Dr. J. G. Hawkes, Birmingham, England—292 phanerogams, Mexico and Central America; Magill College Herbarium, Montreal—3 phanerogams; Dr. Barbara Palser, Chicago—5 phanerogams, California; Milton W. Sanderson, Urbana, Ill.—58 phanerogams, Dominican Republic

Department of Geology

Harold Hinds, Portland, Ore. — partial

(*Continued on page 8, column 3*)

CHINESE RUBBINGS—

(*Continued from page 3*)

mate contact with every detail of the surface to be reproduced. When the paper is dry it is ready for inking with the "inking wad." As the result of this final inking step, there eventually emerge the outlines and designs of the decorative features under the paper . . . and there you have a rubbing! This is, of course, but a skeleton description of the art as actually practiced.

Although it is ordinarily thought of as belonging to antiquity, the art of making rubbings can be applied just as well to modern or contemporary subjects; so that instead of using an ancient stone text or "oracle bone" for reproduction, the design work on a piece of pottery, any artfully tooled metal, designed glass, or the like, may be used. The resultant "rubbing" may be utilized in many ways for desired decorative ends.

This brings us to the last question remaining to be answered—namely, of what value are "rubbings?" Aside from pure aesthetic considerations, or from the opportunity the art provides for the development of a most interesting hobby, or from the commercial use of rubbings on book jackets, magazine covers, etc. (the Museum's collections have often been used for such purposes), rubbings have become rich sources of information, especially for students of the humanities.

The life and customs of civilizations of centuries long past were recorded in stone reliefs on tomb exteriors and interiors, stone pillars, "oracle bones," and other structures of artistic and archaeological significance. Many of these monuments no longer exist, having fallen prey to the destructive forces of nature and man. In many cases our only record of their existence and of the cultures in which they were made lies in "rubbings" made of them while they were still standing.

And so the technique that started as a shortcut for the mass dissemination of Chinese doctrine has survived through the ages to emerge as a little-known art but one that has made, and will continue to make, important contributions in the unfolding of the history of the world.

Primitive jewelry, both ancient and modern, from many parts of the world is included in H.N. Higinbotham Hall of Gems and Jewels (Hall 31).

NEW MEMBERS

(October 19 to November 16)

Life Members

Mrs. G. C. Hodgson, Judd Sackheim

Non-Resident Life Member

Egington Franklin

Sustaining Member

Sam Fink

Associate Members

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CHRISTMAS SHOPPING EASY VIA MUSEUM

The Museum offers two unique special services that make Christmas shopping easy. If you use them you don't have to leave your home, you stay away from crowds, and you don't have to wrap packages. Everything you need to do can be done at your own desk. But, if you prefer to come in to shop, there's free parking, and bus transportation.

First, there is the plan for giving Museum Memberships as Christmas gifts. This is completely described in a separate circular enclosed with this BULLETIN.

Second, there is the Museum BOOK SHOP, which handles orders by mail or telephone (WAbash 2-9410). It has a fine selection of books for both adults and children, all endorsed by members of the Museum scientific staff. It offers unusual art objects, notably authentic native wood-carvings recently received from Africa. There are also novelties, toys, and items for juvenile collectors. The BOOK SHOP will handle all details of wrapping and mailing gift purchases to recipients, together with such personal greetings as the purchaser may specify, charging only postal costs.

GIFTS TO MUSEUM—

(*Continued from page 7*)

skeleton of fossil salamander; W. P. Leutze, Richmond, Va.—21 specimens fossil eurypterids, West Virginia

Department of Zoology

From: Chin Phui Kong, North Borneo—17 frog larvae, 104 fishes; Harry Hoogstraal, Cairo, Egypt—338 bird skins, 3 birds in alcohol, 4 mammals; Malaria Survey and Control Branch, Fort Clayton, Canal Zone—427 batflies; Dr. Orlando Parks, Evanston, Ill.—658 bird skins, 690 mammals, Middle West; Dr. Karl F. Koopman, Chicago—45 reprints of publications on mammals; Comdr. Robert E. Kuntz, San Francisco—mollusks, Formosa; H. de Sousa Lopes, Rio de Janeiro—inland shells; Charles Many, New Orleans—12 land snails; Mrs. J. T. Mauer, Chicago—16 North American moths; Mrs. R. E. McNamara, Kirkwood, Mo.—freshwater mollusks; Dr. Rodger D. Mitchell, Gainesville, Fla.—3 water mites; Museum and Art Gallery, Durban, South Africa—3 bird skins; Mrs. Winston Parker, Kirkwood, Mo.—freshwater mollusks; Mrs. Henry Pope, Glencoe, Ill.—2,000 minute marine shells, Bahamas; Dr. Gerbert Rebell, New Brunswick, N.J.—3 albino rats; Werner Reifsteck, New Haven, Ind.—a freshwater snail; Dr. J. D. Sauer, Madison, Wis.—40 snails, Mauritius; Dr. Jeanne S. Schwengel, Scarsdale, N.Y.—mollusks and marine snails; R. R. Talmadge, Willow Creek, Calif.—120 snails

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